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ABSTRACT

Designed to facilitate communications in future automation projects between library and data processing personnel, especially those projects involving the use of automated systems in the service of disabled patrons, this guide identifies and describes a master set of major circulation system requirements and design considerations, and illustrates various implementations of these requirements among currently operational systems. The first of its three main parts describes the National Library Service for the Blind and Physically Handicapped (NLS/BPH) network components, reviews the methodology used in interviews with library personnel involved in automated circulation systems, describes the libraries included in that survey, and reports on their general automation experiences. Considerations in the development of system requirements are presented in Part II, and Part III introduces and defines a set of requirements in the areas of databases and data elements, major system functions, and database-related operations. A reference list of system documentation and resource materials is provided. Appendices contain summary profiles of libraries surveyed, a listing of available systems developed locally by NLS/BPH libraries, and a checklist of system requirements. (PM)

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Automated Circulation Systems in Libraries Serving the Blind and Physically Handicapped: A Reference Guide for Planning

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May 15, 1981

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Other Cuadra Associates staff members who were consulted in the course of the study and who reviewed this Guide were Dr. Carlos A. Cuadra, Neil G. Cuadra, and Donald A. Blankenship.

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PREFACE

This Reference Guide has been prepared under contract to the National Library Service for the Blind and Physically Handicapped (NLS/BPH), Library of Congress. It is the result of a six-month study undertaken by Cuadra Associates to develop a practical sourcebook for automation planning, for use by libraries that serve blind and physically handicapped individuals.

PURPOSE

Although a sizable body of literature exists on library automation in general, and on library circulation systems specifically, none of these sources addresses itself in a comprehensive fashion to the special system requirements of the libraries that serve blind and physically handicapped individuals. In establishing this study, it was the intention of NLS/BPH to provide its network libraries with a tool that library staff could use in automation planning, whether they elected to develop their own system or to purchase one of the commercially available systems that have been developed for use in libraries of this type.

NLS/BPH specified that the product of the study should focus on the clear and precise articulation of requirements for systems that meet the needs of its network libraries, and that it should draw upon the pioneer efforts of libraries with operational systems and automation experience. A total of 17 Regional Libraries, one Subregional Library, and one statewide network (in Illinois) in the total NLS/BPH network now have automation experience, and there are 13 different circulation systems, representing both commercially available systems and those developed locally under the direction of library staff.

A primary use of this Guide, as foreseen by NLS/BPH, is to facilitate communications in future automation projects between library and data processing personnel, regardless of whether currently available systems are being evaluated or a new system is being designed. In interpreting this objective, we have neither prescribed a single, ideal system, nor represented the requirements

associated with a single design choice. The complexity of library operations and the dynamic state of the automation art preclude any step-by-step "cookbook" approach to automation. It has been our objective, instead, to identify and describe a master set of major circulation system requirements, with a number of design considerations, and to illustrate various implementations of these requirements among currently operational systems. Library personnel will be able to use this set of requirements as a reference tool, to help them identify and select those requirements that are applicable to their own environment and service objectives, and to use the terminology and definitions as a departure point in working with data processing personnel to establish their own system specifications and/or to reflect them accurately in a request for proposal or in a request for bid.

ORGANIZATION AND USE OF GUIDE

This Reference Guide is organized into these three Parts:

Part I. Introduction and Background. In a set of four chapters, we describe the NLS/BPH network components, review the methodology used in this study, describe briefly the Libraries included in this study, and report on their general automation experiences.

Part II. Reference Guide to Basic Circulation System Concepts. As an introduction and overview to Part III, we present in two chapters some of the major considerations that should be taken into account in developing system requirements. These considerations need to be addressed by the library staff prior to, or early in the course of, a requirements analysis, because they involve fundamental choices in the identification and definition of needed system elements and in the specification of service and performance characteristics of the circulation system.

Part III. Reference Guide to Circulation System Requirements. In a set of three chapters, we introduce and define a set of requirements in these areas: databases and data elements, for borrowers, books, magazines, and equipment; major system functions, covering selection,

check-out, and check-in; and database-related operations, including access and display of data, record creation and updating of files, and statistical and other output reports.

A summary description (Profile) of each Library that was interviewed (on-site or in telephone conversations) in this study is provided in Appendix A. Appendix B contains a reference listing of available systems--both those that are commercially available and those that have been developed locally under the sponsorship and guidance of one or more Libraries. Appendix C contains a checklist of the complete set of requirements that are presented and discussed in Part III. This checklist can be used by library staff as a reference aid in conducting their own requirements analysis. A selected reference list of documentation and automation project descriptions that were made available to us for purposes of this study is also provided.

PART I. INTRODUCTION AND BACKGROUND

The first four chapters provide readers with an overview of the NLS/BPH network and, specifically, of the subset of Libraries* in the NLS/BPH network that were included in this study. They also describe the methodology used in the study, summarize the experiences of the Libraries in automation planning and implementation, and discuss the major choices that they have made.

*Throughout this report, we use Library (with a capital L) when referring to one or more of the NLS/BPH network libraries that were included in this study.

CHAPTER 1.

OVERVIEW OF THE NLS/BPH NETWORK*

For readers of this Guide who are unfamiliar with library services for blind and physically handicapped individuals, this section contains a brief overview of some of the major activities of the National Library Service for the Blind and Physically Handicapped (NLS/BPH), Library of Congress, and the constituents of its network of libraries and service centers.

The national library program administered by NLS/BPH was established by Congress in 1931. Braille and recorded materials are provided to blind and physically handicapped individuals who are unable to read or use standard printed materials. As shown in Exhibit 1, there are a number of multistate, state, and local participants in this network. The roles of the various network participants are described briefly below.

ROLE OF NLS/BPH

NLS/BPH selects and produces full-length books and magazines in braille and on recorded disc and cassette, under copyright releases provided by authors and publishers. Its selection criteria are aimed at providing blind and physically handicapped individuals with access to standard classics and informational as well as popular and recreational materials--the range of titles that are available to other citizens through their public libraries. In 1952, legislation was passed to expand the service to include children's materials, so NLS/BPH selections now represent the full range of reading levels. In 1962, coverage was expanded to include music materials, both scores and texts. In its production of books, in quantities of 80 to more than 1000 copies, NLS/BPH utilizes commercial and non-profit organizations as well as some volunteers. Through the network, services are now provided to a readership of more than 750,000 eligible residents of the U.S. and citizens living abroad.

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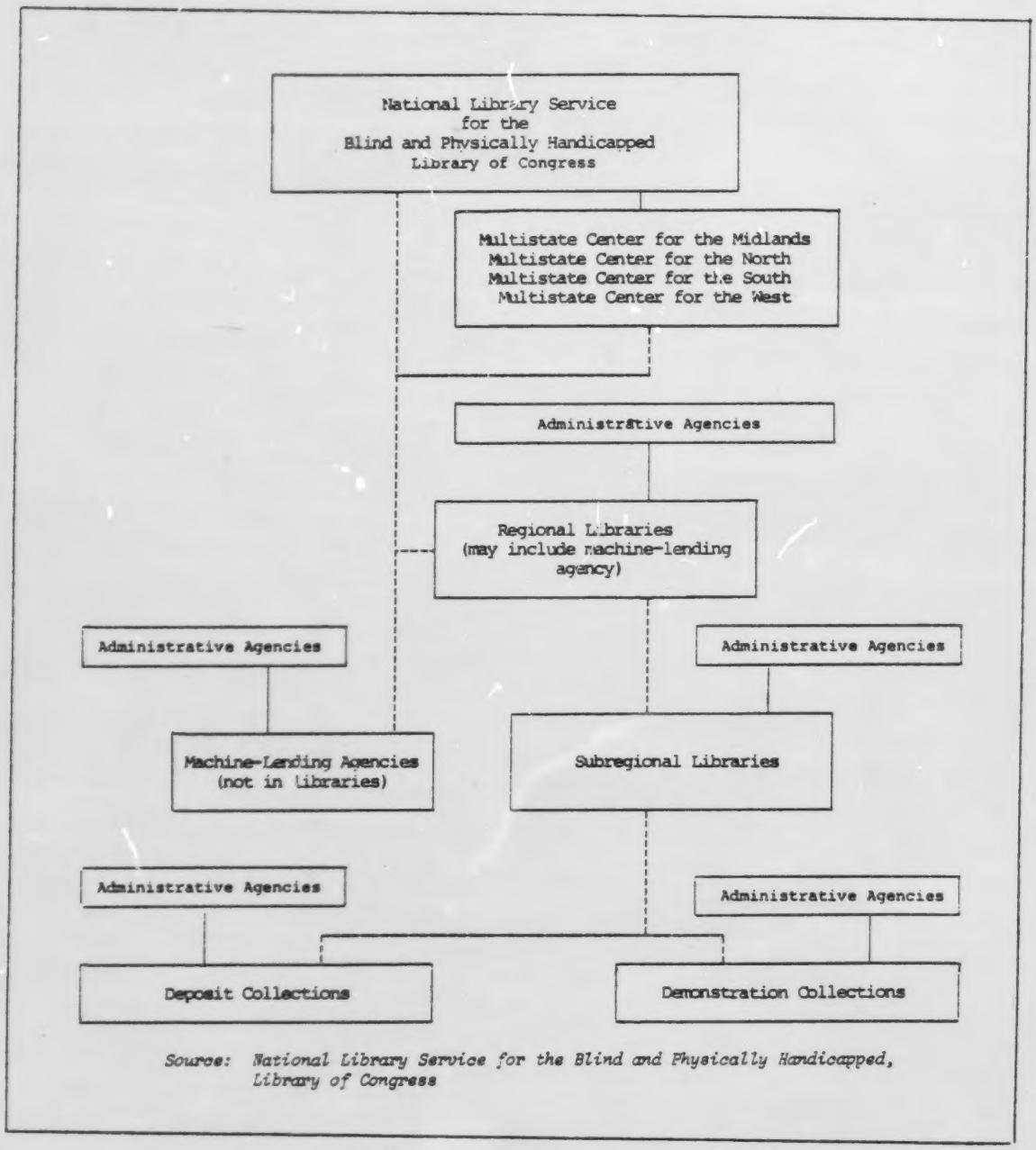
*The overview provided in this section has been extracted from materials provided by NLS/BPH.

Exhibit 1. Components in the NLS/BPH Network



Source: National Library Service for the Blind and Physically Handicapped, Library of Congress

Provision of Bibliographic Access

In addition to these basic production services, NLS/BPH provides bibliographic access tools to its collection of approximately 30,000 titles through catalogs of braille and recorded books, reference circulars covering special topics, and selected subject bibliographies. Two major catalogs used by eligible borrowers to select items of their choice are Talking Book Topics and Braille Book Review, bimonthly publications that list recorded and braille books and magazines available through the network. These publications--prepared in special media--are distributed free by NLS/BPH to subscribers in the program. A master list of borrowers, generated through input from the network libraries, is maintained in a computer-readable Comprehensive Mailing List System. Network libraries that are automated are beginning to submit borrower data to NLS/BPH in computer-readable form, and the potential now exists for future computerized data transmission between the network libraries and NLS/BPH, to minimize redundant keying of borrower data.

Bibliographic data and annotations for the NLS/BPH collection are maintained on microfiche, and cumulative updates are distributed to network libraries on a quarterly basis. The collection grows at the rate of about 2000 new titles per year. Data are also maintained in computer-readable form, in modified MARC format, and are available for searching as a private database through one of the major online bibliographic services. Although not presently interfaced with any of the automated circulation systems to be discussed in this Guide, the online database can be used by network libraries for complex subject searches, for searches of items on which only partial citation information is available, and for the production of subject or other types of bibliographies, e.g., all recorded books in Sparish, grades 6-9.

Deposit and Demonstration Collections

Among its other services, NLS/BPH supports deposit collections, through its regional and subregional library network members, in institutions that have eligible users. Examples of such institutions include nursing homes, convalescent centers, hospitals, and public libraries. In 1980, the network supported more than 19,000 deposit collections.

Samples of reading materials and equipment are also provided for use in public libraries and other institutions as demonstration collections. These collections make the availability of services to blind and physically handicapped individuals more widely known and help other institutions provide emergency services to blind or physically handicapped individuals in their areas.

ROLE OF REGIONAL AND SUBREGIONAL LIBRARIES

In 1931, NLS/BPH and a set of 18 regional libraries instituted services to circulate materials produced by NLS/BPH to eligible borrowers. This network now comprises 56 regional libraries, including at least one in each state (except North Dakota and Wyoming, which are served by other states), the District of Columbia, Puerto Rico, and the Virgin Islands. Most of the libraries are administered by state or local government agencies and many are recipients of grants under Title I of the Library Services and Construction Act (LSCA).

These libraries perform outreach functions in their geographic areas of service. They identify eligible borrowers, communicate with them about available services, assist in book selection, and circulate materials, primarily through the mail. In addition, most of the libraries record locally oriented materials, textbooks, and other types of items that are not within the scope of materials produced by NLS/BPH. Other services that they offer include the provision of sample aids and equipment, inter-library loan, reference, tape duplication, equipment assignment, and publications distribution.

To help provide these services, a number of states have, with NLS/BPH approval, designated subregional libraries--generally local public libraries--to assume some subset of responsibilities for services in limited geographical areas. These responsibilities can include mail and walk-in circulation and equipment loan; identification of new borrowers; and assistance in book selection and other personalized reference service. As of 1981, there were about 100 subregional or branch service units in 22 states.

ROLE OF MULTISTATE CENTERS

NLS/BPH has established four multistate centers (MSCs) to cover the West, North, South, and Midlands. These agencies operate under contract to NLS/BPH to provide backup materials and related services to regional and subregional libraries located in their areas. The primary responsibilities of these MSCs are to house and lend, through inter-library loan, all library materials available in the NLS/BPH program; to maintain and circulate collections of lesser-used materials; to store and lend sound reproducers and related equipment; and to house and ship nationally produced program materials, including brochures, catalogs, and bibliographies.

ROLE OF MACHINE-LENDING AGENCIES

State or local agencies are designated by NLS/BPH to receive, issue, and control federally supplied playback equipment, including record players, cassette machines, and accessories, for use by eligible borrowers in the program. Most of these agencies are co-located with a regional library, although in some geographic areas, machine-lending functions are performed by other agencies.

CHAPTER 2.
REVIEW OF METHODOLOGY

This six-month study involved a number of tasks intended to produce background information for use in developing this Reference Guide. Major reliance was placed on personal interviews with library personnel involved in automated circulation systems. In our interviews, we focused on two major areas:

- General background information about each network Library and its automation experience. There has been considerable sharing of information within this community of Libraries during their automation efforts over the past decade. However, as the number of libraries involved in automation continues to grow and their experiences become more diversified, the sharing of information can be expected to become more difficult to accomplish. The documentation of some of these experiences will provide an initial starting point for other NLS/BPH network libraries in their early planning stages and, in addition, will help those libraries to identify and select libraries with automation experience that they want to contact or visit for further information.

- System capability information. Detailed information on capabilities and features of automated systems that are presently being used by the network Libraries was obtained as the basis for our developing a set of major system requirements. Other network libraries will be able to use this "master" set of requirements as an initial framework for conducting their own requirements analysis.

Upon project startup, NLS/BPH identified a total of 26 libraries in the network that were thought to be involved in some stage of automation planning or operations. After further contact, we learned that 14 of these libraries were completely operational or nearly operational, five were well under way with automation projects, and the remaining seven libraries were in various stages of planning. The latter libraries were not included in this study. The 19 Libraries studied are listed in Exhibit 2, which also indicates which Libraries were interviewed on site and which ones were interviewed by telephone.

Exhibit 2. Study Population of Automated NLS/BPH Libraries

Libraries (Site Visits)		
State (Code)	City	Name
Alabama (AL)	Montgomery	Alabama Regional Library for the Blind and Physically Handicapped
California (CA)	Los Angeles	Braille Institute of America, Inc. Library*
Colorado (CO)	Denver	Colorado State Library, Services for the Blind and Physically Handicapped
Florida (FL)	Daytona Beach	Florida Regional Library for the Blind and Physically Handicapped
Illinois (IL)	Chicago	Illinois Regional Library for the Blind and Physically Handicapped, Chicago Public Library
New Jersey (NJ)	Trenton	New Jersey Library for the Blind and Physically Handicapped
Ohio (OH)	Cincinnati	Library for the Blind and Physically Handicapped
Pennsylvania (PA)	Pittsburgh	Library for the Blind and Physically Handicapped, Carnegie Library of Pittsburgh

*Test site for development of interview guide.

Exhibit 2. Study Population of Automated NLS/BPH Libraries (Part 2)

Libraries (Telephone Interviews)		
State (Code)	City	Name
California (CA)	Sacramento	Books for the Blind and Physically Handicapped, California State Library
Massachusetts (MA)	Worcester	Talking Book Library, Worcester Public Library
Michigan (MI)	Lansing	Michigan Regional Library for the Blind and Physically Handicapped, Michigan Department of Education
Missouri (MO)	St. Louis	Wolfner Memorial Library for the Blind and Physically Handicapped
New York (NY)	Albany	New York State Library for the Blind and Visually Handicapped
New York (NY)	New York	Library for the Blind and Physically Handicapped, New York Public Library
Ohio (OH)	Cleveland	Cleveland Public Library, Library for the Blind and Physically Handicapped
Pennsylvania (PA)	Philadelphia	Library for the Blind and Physically Handicapped, Free Library of Philadelphia
Tennessee (TN)	Nashville	Tennessee Regional Library for the Blind and Physically Handicapped
Texas (TX)	Austin	Texas State Library, Division for the Blind and Physically Handicapped
Wisconsin (WI)	Milwaukee	Wisconsin Regional Library for the Blind and Physically Handicapped

We also indicate in this Exhibit the names we will use for convenience and ease of reference throughout the text and in subsequent exhibits. In the text, we will generally refer to the Library by the state or city in which it is located; in the exhibits, we generally provide the state code and, in cases where either or both of a state's two Regional Libraries are included in the study population, we provide both the state code and the city. In the case of Pennsylvania, where the Regional Libraries in Philadelphia and Pittsburgh shared the development of a single system that is used on-site independently at each Library, we refer to them as the Pennsylvania Libraries or the Pennsylvania system. For the six Libraries that now use the Data Research Associates, Inc. (DRA) system, we generally refer to the DRA system, rather than to each Library. Reference is also made to the Neoterics system, used by the Regional Library in New Jersey.

PRELIMINARY STUDY ACTIVITIES

As background for the tasks to follow, the project team requested from each of the Libraries documentation that was available on their systems and/or on the planning process. These items were reviewed to help in the development of interview guides and to create an initial set of system requirements. This "starter set" of requirements was to be used as the basis for discussions with the automated Libraries, to clarify and, as needed, expand the list into a full set of possible system requirements, representative of the 13 different systems used by the 19 Libraries.

The master set of requirements was not intended to represent an "ideal" system but, instead, to provide a fairly complete set of possible requirements that should be considered for their applicability to a particular library's situation. Exhibit 3 presents a sample page from the draft set of 22 pages of requirements. These requirements cover alternative circulation functions and the data elements in each of the system databases.

DATA GATHERING AND ANALYSIS

Two sets of interview guides were developed and refined through initial testing. The areas of inquiry are shown in Exhibit 4. In advance of the interviews, we mailed to each of the Libraries sets of materials that identified the areas to be covered during the on-site (or telephone) interviews. For the site-visit libraries, these materials included the complete set of initial requirements. Some responses were provided by the Libraries in writing, either prior to or after the interview. Overall, we received full support from these Libraries in all phases of the study.

During the one-day, on-site visits, we were able to cover, in more depth than was possible in one-hour telephone interviews, the Libraries' system capabilities and planning/implementation experiences.

Exhibit 3. Sample Page from Initial (Draft) Set of Requirements

CAPABILITY OR DATABASE	APPLICATION		IMPORTANCE			
	Operational	Planned	1	2	3	4
2. THE SYSTEM MUST PROVIDE FOR THE SELECTION OF BOOKS FOR BORROWERS.						
2.1 The Terminal User must be able to record in the Borrower Database the book number and/or title of books requested (and/or reserved) by a Borrower, with the date each request (or reserve) was made.						
2.2 The system must assist the Terminal User in selecting books for a Borrower.						
2.2.1 The Terminal User must be able to determine which Borrowers have request lists with fewer than the required minimum number of books specified in the Borrower Database.						
2.2.2 The Terminal User must be able to determine the number of books needed to bring the Borrower's request list to the minimum size specified in the Borrower Database.						
2.2.3 The Terminal User must be able to retrieve and display the Borrower's reading interest profile.						
2.2.4 The Terminal User must be able to update the Borrower's request list with information on each selected book.						
2.2.5 The Terminal User must be able to indicate which of the selected books are to be circulated immediately.						
2.2.6 The system must provide feedback to the Terminal User when a selected book does not match the Borrower's reading profile.						
2.2.7 The system must provide feedback to the Terminal User when a new selection made is listed on the Borrower's HAS-NOW, HAS-HAD, Request, or Reserve lists.						
2.3 The system must select books automatically for Borrowers.						
2.3.1 The system must determine which Borrowers are due for automatic selection.						
2.3.2 The system must determine how many items are to be selected for a Borrower.						
2.3.3 The system must check that selected books:						
2.3.3.1 Match the Borrower's reading profile.						
2.3.3.2 Do not appear on the Borrower's HAS-NOW list.						
2.3.3.3 Do not appear on the Borrower's HAS-HAD list.						
2.3.3.4 Do not appear on the Borrower's request list.						
2.3.3.5 Do not appear on the Borrower's reserve list.						
2.3.3.6 Are available for check-out.						
2.3.4 The system must be able to add the book number and/or title of each selected book to the Borrower's request list, with the date of the request.						

Exhibit 4. Topics Covered in Interviews

A. GENERAL OVERVIEW OF LIBRARY AND ITS AUTOMATION ACTIVITY

- +Library name, address, telephone number
- +Director
- +Sponsoring and operating agency
- +Founding date
- +Staff size
- +Scope of service
- +Borrower, circulation, and inventory statistics
- +System overview (including name and developer; operational status; previous system used, if any; implementation mode; programming language; system availability; and hardware configuration)
- *Planning, development, and implementation procedures and problems
- *Automation costs
- *Evaluation (including advantages and disadvantages, and impact on staff and services)
- +Future plans

B. SYSTEM CAPABILITIES

- *Databases (including elements of data, access points, and maintenance)
- +*Functions (including book selection, check-out, production of mailing labels, check-in, and statistical report generation)
- *Security
- *System performance
- *System backup and recovery

+These areas or selected items within these areas are reported, by Library, in the set of Profiles given in Appendix A.

*Fewer or no questions at all in these areas were covered in the telephone interviews.

Profile Development

Data obtained from both modes of data gathering--on-site and telephone interviews--were formatted for presentation in a Profile of each Library and summarized for use in various charts presented in this Guide. Each Profile was sent to the participating Library for verification, prior to its being finalized for inclusion in Appendix A.

Requirements Development

The eight site-visit Libraries have been the primary contributors to the set of requirements identified and discussed in Part III of this Guide. The telephone interviews, conducted during the two-week period following completion of the site visits, focused on those areas of requirements that most clearly differentiate the capabilities of various systems.

Preparation and Review of Guide

A draft of this Guide was prepared for distribution to NLS/BPH and all of the participating Libraries. Comments and suggestions were carefully reviewed and considered in preparation of the final manuscript.

CHAPTER 3.
OVERVIEW OF THE STUDY POPULATION

The Libraries that were included in this study represent an impressive aggregate of years of service to blind and physically handicapped individuals. Over half of them have a tradition of service in their states that began in the late 1800s (e.g., 1894, 1896) or early 1900s (e.g., 1905, the 1920s), and 11 of the Libraries were among the original set of 19 (including NLS/BPH) in the network, when the program was established in 1931. According to NLS/BPH, these Libraries include many of the largest Regional Libraries, representing close to 50 percent of readers served through the network.

In this section, we summarize the data that were obtained on operating environments and services of the Libraries in the study. A number of more specific characteristics related to automated system requirements and implementations are presented throughout this Guide and are summarized, for each Library, in Appendix A.

The overview statistics indicate that automation is being used by Libraries of various sizes and service levels, and in a variety of settings. These data also help to characterize the study population along certain dimensions that may be useful for other libraries to consider, in their early planning stages, as they seek to identify counterparts of similar size and characteristics that they may want to visit or contact.

SERVICE ENVIRONMENTS

As shown in Exhibit 5, the majority of Libraries in the study are Regional Libraries operated at the state level or, under contract to a state agency, at the local level. In cases where the operating agency is not part of the state government, the sponsoring state agencies typically provide operating budgets and the local agencies provide some administrative, overhead, and/or clerical support. In the case of the Braille Institute

Exhibit 5. Service Environments

LIBRARY	OPERATING AGENCY			NLS/BPH NETWORK ROLE			SERVICE AREA*		
	State Library or Agency	City or County Library	Private, Non-Profit Organization	Regional Library	Sub-regional Library	Other	State-wide	Selected Part of State	Backup to Sub-regionals
AL	X	--	--	X	--	Will soon assume service to U.S. citizens abroad	--	X	X
CA (Los Angeles)	--	--	X	X	--		--	X	--
CA (Sacramento)	X	--	--	X	--		--	X	--
CO	X	--	--	X	--		X	--	--
FL	X	--	--	X	--	Multistate Center of the South	X	X	X
IL	X	X	--	X	--		X	--	X
MA (Worcester)	--	X	--	--	X		--	X	--
MI (Lansing)	X	--	--	X	--		X	--	--
MO	X	--	--	X	--		X	--	--
NJ	X	--	--	X	--		--	X	--
NY (Albany)	X	--	--	X	--		--	X	X
NY (New York)	--	X	--	X	--		--	X	X
OH (Cincinnati)	--	X	--	X	--	--	--	X	--

*Multiple entries represent several different situations of distributed responsibilities defined geographically and by media. See text for discussion.

Exhibit 5. Service Environments (Part 2)

LIBRARY	OPERATING AGENCY			NLS/BPH NETWORK ROLE			SERVICE AREA		
	State Library or Agency	City or County Library	Private, Non-Profit Organization	Regional Library	Sub-regional Library	Other	State-wide	Selected Part of State	Backup to Sub-regionals
OH (Cleveland)	--	X	--	X	--		--	X	--
PA (Philadelphia)	--	X	--	X	--		X	X	--
PA (Pittsburgh)	--	X	--	X	--		--	X	--
TN	X	--	--	X	--		X	--	--
TX	X	--	--	X	--		X	--	--
WI	--	X	--	X	--		X	X	X

of America, Inc., the State of California provides the Regional Library's operating budget, but the Institute funds its capital expenses.

As indicated earlier in the Introduction, most Regional Libraries are involved in the production of locally oriented materials, to supplement the titles provided by NLS/BPH. Some of the Libraries have additional responsibilities (as do others, not included in this study) within the NLS/BPH network, as indicated in Exhibit 5. For example, as one of the four multistate centers, Florida provides backup materials and related services to regional and subregional libraries located in the South.

Of the 19 Libraries, 5 are in states that also have subregional libraries. The Service Areas shown in the Exhibit do not reflect all of the different ways in which service responsibilities are distributed, both geographically and by media, in these states. For example, in Florida there are six subregionals that serve approximately 30 percent of the eligible borrowers; most of the borrowers are served directly by the Regional Library, which also services the entire state for equipment and magazines. In contrast, Illinois has a total of 16 subregionals, which provide direct service in each of their areas in the circulation of disks and cassettes. The Regional Library provides braille, equipment, and magazine services throughout the state and backup services for the subregionals. In Pennsylvania, the Regional Library in Philadelphia provides braille service throughout the state and in West Virginia.

STAFF SIZES

The total number of professional and support personnel in the Libraries ranges from 3 to 43, as shown in Exhibit 6. The mean is 21.2. The range in size of professional staff is from 1 to 9. For support staff (e.g., paraprofessionals; clericals; shipping clerks), it is from 2 (in the Massachusetts Subregional Library) to 34 (in the Texas Regional Library).

Exhibit 6. Professional and Support Staff

LIBRARY	STAFF		
	Professionals	Support	Total
AL	5	10	15
CA (Los Angeles)	3	27	30
CA (Sacramento)	4	19	23
CO	3	7.5	10.5
FL	5	24	29
IL	4	25	29
MA (Worcester)	1	2	3
MI (Lansing)	9	13	22
MO	3	15	18
NJ	5	23	28
NY (Albany)	5	20	25
NY (New York City)	9	16	25
OH (Cincinnati)	1	10.5	11.5
OH (Cleveland)	3	6.9	9.9
PA (Philadelphia)	4	23	27
PA (Pittsburgh)	4	15	19
TN	2	11	13
TX	9	34	43
WI	2	11	13

A summary of these data, using the total number of personnel, is given below:

3.0 to 10.5:	3 Libraries [CO; MA (Worcester); OH (Cleveland)]
11.5 to 19.0:	6 Libraries [AL; MO; OH (Cincinnati); PA (Pittsburgh); TN; WI]
22.0 to 29.0:	8 Libraries [CA (Sacramento); FL; IL; MI (Lansing); NJ; NY (Albany); NY (New York); PA (Philadelphia)]
30.0 to 43.0:	2 Libraries [CA (Los Angeles); TX]

SERVICE AND INVENTORY STATISTICS

Exhibit 7 presents data on the service volumes of these Libraries, in terms of numbers of active borrowers (as opposed to numbers on mailing lists). The number of active individual borrowers who are served ranges from 763 to 18,327, with a median of about 8155. The number of active institutional borrowers, each of which is estimated to serve about 10 individuals, is from 132 to 1320, with a median of about 433. (In most cases, these data represent 1980 statistics, although some Libraries gave us 1981 data.)

Of the 11 Libraries for which such information was available, six indicated that they serve most or all of their active borrowers each month. The remaining libraries serve anywhere from 10 percent to 69 percent of their active borrowers each month. On-site service is typically provided to about 5 or 6 readers per day, although the Los Angeles and Philadelphia Regional Libraries have an average of over 70 on-site readers per day.

Annual circulation (based on fiscal year 1980 data) for these Libraries ranges from 33,500 (for the Massachusetts Subregional Library) to over 860,000 items (for the Texas Regional Library). The circulation levels in the 19 Libraries are represented in Exhibit 8, with an indication of the types of materials included in the statistics. Where a library provides service for a particular type of item, but circulation data for those items are not represented in the circulation statistics, the X is placed in parentheses. (A summary of types of collection items that are presently handled in the Libraries' computerized circulation systems is provided in Part II.)

Exhibit 7. Numbers of Active Individual and Institutional Borrowers

LIBRARY	BORROWERS	
	Individuals	Institutions
AL	1,800	160
CA (Los Angeles)	11,992	606
CA (Sacramento)	8,325	796
CO	4,031	270
FL*	18,327	1,317
IL*	11,291	1,241
MA (Worcester)	763	132
MI (Lansing)	10,959	1,116
MO	7,014	295
NJ	7,000	300
NY (Albany)	12,300	1,000
NY (New York)	8,042	512
OH (Cincinnati)	6,553	235
OH (Cleveland)	8,269	702
PA (Philadelphia)	11,000	800
PA (Pittsburgh)	6,121	354
TN	4,414	209
TX	15,894	1,320
WI	8,650	350

*Includes subregional libraries

Exhibit 8. Circulation Statistics

LIBRARY	ANNUAL CIRCULATION[1]						MATERIALS INCLUDED[2]				
	30K-74K	75K-99K	100-299K	300-499K	500-749K	750-860K	BOOKS			MAG	EQUIP
							Recorded	Braille	Large Print		
AL	--	X	--	--	--	--	X	X	--	X	X
CA (Los Angeles)	--	--	--	X	--	--	X	X	X	X	(X)
CA (Sacramento)	--	--	--	X	--	--	X	X	--	X	(X)
CO	--	--	X	--	--	--	X	--	X	X	(X)
FL	--	--	--	--	X[3]	--	X	X	--	X	(X)
IL	--	--	--	X[3]	--	--	X	X	--	(X)	(X)
MA (Worcester)	X	--	--	--	--	--	X	--	--	--	--
MI (Lansing)	--	--	--	X	--	--	X	X	X	X	X
MO	--	--	--	X	--	--	X	X	--	--	(X)
NJ	--	--	--	X	--	--	X	X	X	X	--
NY (Albany)	--	--	--	X	--	--	X	X	X	(X)	(X)
NY (New York)	--	--	X	--	--	--	X	X	--	X	X

(1) Ranges are presented in thousands, represented by K; data are generally for Fiscal Year 1980

(2) Recorded media generally include disk and cassette; reel-to-reel tapes are covered by only a few libraries. An (X) indicates that service for this type of material is provided but that data are not included in these Annual Circulation statistics.

(3) Represents statewide circulation data.

Exhibit 8. Circulation Statistics (Part 2)

LIBRARY	ANNUAL CIRCULATION						MATERIALS INCLUDED				
	30K-74K	75K-99K	100-299K	300-499K	500-749K	750-860K	BOOKS			MAG	EQUIP
							Recorded	Braille	Large Print		
OH (Cincinnati)	--	--	X	--	--	--	X	X	--	X	--
OH (Cleveland)	--	--	--	X	--	--	X	X	--	X	--
PA (Philadelphia)	--	--	--	--	X	--	X	X	X	X	X
PA (Pittsburgh)	--	--	--	--	X	--	X	--	X	X	(X)
TN	--	--	X	--	--	--	X	X	X	X	(X)
TX	--	--	--	--	--	X	X	X	X	X	--
WI	--	--	X	--	--	--	X	X	X	X	X

Although statistics on the numbers of titles and copies in each book medium were not readily available from all Libraries, they were available for most of the Libraries. They are shown in Exhibit 9. As indicated in the Exhibit, some of the "copies" data actually reflect the number of containers for recorded titles and the number of volumes for braille titles. Although there are exceptions, the container statistics are fairly equivalent to numbers of copies. However, in the case of braille materials, the numbers of volumes are likely to exceed numbers of copies, because a complete title is usually presented in several volumes.

As discussed later, in Part II, computing the sizes of library databases in the various media requires knowledge of numbers of titles, numbers of copies, and numbers of volumes or containers and, even then, estimates can vary, depending upon the particular way in which items are handled in the computerized system. The complexity of database design for these libraries is reflected in this fact, as well as in the fact that a given title and subsequent re-issues are often held in multiple media.

For Libraries that circulate magazines in one or more media, the range in numbers of subscriptions is from 829 to 7176, and the median is 2470. The inventory of equipment units (including both machines and accessories) ranges from 3251 to over 50,000 for the reporting Libraries; the median is about 20,500.

Exhibit 9. Book Titles and Copy Inventory Statistics

NUMBERS OF TITLES	RECORDED BOOKS		OTHER BOOKS	
	Disk	Cassette	Braille	Large Print
.9 - 1.9K			TN	CO; TN
2.0 - 3.9K				MI (Lansing); NJ; TX
4.0 - 5.9K		MA(Worcester); NY(Albany); OH(Cincinnati); PA(Philadelphia); TN	AL; NJ; OH(Cincinnati)	PA (Philadelphia)
6.0 - 7.9K	MA(Worcester); TN	CO; FL; IL	FL; PA(Philadelphia); TX	
8.0 - 9.9K	CO; FL; IL; MI(Lansing) NJ; NY(Albany); OH(Cincinnati); TX	MI(Lansing); NJ; TX	CA(Sacramento); IL; NY(Albany)	
10.0 -11.9K	PA (Philadelphia)			
12.0 -16.7K	AL			

Exhibit 9. Book Titles and Copy Inventory Statistics (Part 2)

NUMBERS OF COPIES	RECORDED BOOKS		OTHER BOOKS	
	Disk	Cassette	Braille	Large Print
5 - 24.9K			AL; CA(Sacramento); FL; MO*; NJ; NY (New York); OH(Cincinnati); OH(Cleveland); PA(Philadelphia)	CO; MI(Lansing); NJ; PA(Philadelphia); PA(Pittsburgh); TX
25 - 44.9K	CO	CO; OH(Cincinnati)	IL*; MI(Lansing) NY(Albany)	
45 - 64.9K	IL; MO*	AL; IL; MO*	TX*	
65 - 104.9K	AL; CA(Sacramento); FL; MI; OH(Cincinnati);OH (Cleveland)	CA(Sacramento); NJ; OH (Cleveland); PA(Phila.)		
105 - 124.9K	NJ	NY(Albany); PA(Pitts.)		
125 - 164.9K	PA(Pittsburgh); TX	FL; TX		
165 - 184.9K		MI(Lansing)		
185 - 204.9				
205 - 224.9K				
225 - 244.9K				
245 - 265.0K	PA(Philadelphia)			
265 - 285.0K	NY(Albany)			

*Numbers of containers or volumes

CHAPTER 4.

MAJOR PLANNING AND OPERATIONAL CONSIDERATIONS

Automation of circulation functions in a library involves a number of different steps and decisions, including assessment of needs and establishment of expectations; identification of resources and constraints; analysis of requirements; study of available alternatives; estimation of costs; justification of expenditures; and the development of an overall plan and schedule for selection (or design and programming) of a system, implementation, and full-scale operations.

These and other steps and decisions have been formalized and documented extensively in the general systems analysis and automation literature, and it is not our purpose to provide a tutorial on this process. However, we believe that it is useful to identify and discuss a number of major planning considerations by presenting anecdotal data from the 19 network Libraries that have undertaken automation projects. Their experiences can help to contribute to the development of realistically based planning approaches by other libraries, and they also help to illustrate the fluid and iterative nature of the planning (and development) process.

AUTOMATION BENEFITS AND LIMITATIONS

For the majority of Libraries in this study, automation was adopted to relieve a critical overload situation. Descriptions of the overload situations prior to automation were strikingly similar among many of the Libraries, as can be seen in these representative comments:*

> Prior to automating, we were serving only 60 percent of our patrons. The collapse of our manual system had been predicted two years before, and it occurred.
>
> Additions to our staff over the past several years had not resulted in improvements to the service. We were growing too fast to keep up and

---

*Comments from Library staff are not verbatim; most comments have been edited for clarity of presentation.

> complaints were coming in more frequently. It was not possible to become any more productive under the manual system.
>
> We tried to keep up with demand by adding staff and improving the manual system, but we just couldn't keep up.
>
> At least 80 percent of our patrons have books selected by our staff, and we just could not keep up with the load.
>
> We could not keep up with a 24-to-48-hour turnaround time in our service.
>
> Book selections were being done by clerical personnel, and the quality of service could not be maintained.

The assortment of ills were summarized well in a list provided by one Director: "we were unable to meet demands for service; had no space for patron folders; had too much paperwork; turnaround time on returned books was unacceptable; much of the work was tedious and repetitive; and we had poor inventory control."

In almost all cases, the Libraries were able to point to improved efficiencies and productivity that resulted from automation. In a few cases, statistical evidence of this was offered: one Library has been able to circulate twice the number of items with six fewer support staff; another has also doubled its circulation each year with no staff increases and is serving its patrons regularly, rather than in "feast-or-famine" cycles.

Some of the benefits from automation are less tangible. Although there is no universal agreement in all of these areas, a number of Libraries pointed to the positive impact on staff morale, improved selection of books for patrons, reduction in errors, better management, more personalized service, and overall improved responsiveness. An unexpected benefit reported by one Library is the increase--apparently correlated with the installation of the automated system--of unsolicited gifts to its trust fund.

Some drawbacks and disadvantages are also perceived. Some of these disadvantages are directly related to system limitations, primarily resulting from compromises that were made in the development stage. Other concerns were more general:

Like any automation, it cramps our style when the system goes down.

True with this or any system: automation tends to impersonalize service. People begin to depend on the computer and this erodes closeness between the selector and patrons. Selectors also tend to know less about books because there is less handling of cards with annotations and other information.

Staff still must do repetitive tasks (e.g., entering patron requests or returns) that become boring.

The system requires lots of "hand holding."

When system is down, it affects all of us, but the plusses far outweigh the minuses.

Not as aware of what is happening as in a manual system; much is hidden, and sometimes we have a hunch that something is wrong, but it takes time to find enough evidence.

Overall, the Libraries appear to be satisfied that automation is helping to make the needed improvements in productivity. As one Director put it, "it lets us get out books in the way we want in the time that we want."

Establishing the benefits of library automation in any given context is not easy. The complexities of conducting a cost-benefit analysis project are described well in the evaluation report on the Cincinnati ABCD (Automation of the Blind Library and Cassette Duplication) project. This multi-purpose project, which was funded locally and by LSCA Title I funds from the Ohio State Library Board, cost somewhat over $245,000 over a period of four years. In relating the benefits of automation to the intended project objectives, this report indicates that, although the desired 29.2 percent increase in readership (over two years) had not yet been realized, the growth rate between 1975, the start of the automation project, and 1978, after automation was completed, was 13 percent, well above the national rate. The problem with this particular measurement is that it goes hand-in-hand with another part of this Library's project activities, the development of an active promotional campaign to solicit new readers. However, work on this activity could not begin until the automated system was operational, because the staff could not, under the manual system, commit to undertaking service

to any significant numbers of new readers. Therefore, the real question is: what would the growth rate in readers have been if the automated system had not been installed?

In an independently conducted study of the same Library, it was learned that most of the Library's readers did not notice any reduction in turn-around time: 34.3 percent indicated that it had improved, but 65.7 percent indicated that it had remained the same. In several of the survey items designed to detect improved quality of service, this same mixed response was received. However, the same question needs to be asked: what would the responses have been had the automated system not been installed? In another aspect of its evaluation, the Library reviewed the pre- and post-automation costs per reader, computed by dividing total operating expenditures by the number of readers. The results were as follows:

1972:	$23.68	
1973:	$18.96	
1974:	$17.45	
1975:	$25.23	[year automation project began]
1976:	$32.38	
1977:	$27.55	[year fully automated]
1978:	$28.10	

Similar trendlines were evident in looking at costs per item circulated. The findings are very important, because they show that the Library is successfully holding the line against inflation. Although costs per reader and costs per circulation rose between 1977 and 1978, the increases were well under the rate of inflation. The Library indicates that automation has helped to achieve a lower incremental cost of processing new readers, as well as direct savings in labor. Before automation, the Library had 9 full-time equivalents; in 1977, after it became fully automated, it had 6.7 full-time equivalents. As indicated by this Library's addition in 1978 of another individual to handle calls on a WATS line service, automation does not necessarily lead to reduced staffing. For example, staff may be diverted to other activities or new staff may be added to provide new types of services. Therefore, in examining the direct impact of automation on staff costs, one must try to determine how many staff would be needed to maintain, without automation, the same level of service that is provided with automation.

The question of "critical mass" for automation--i.e., when it becomes clearly cost-effective to automate--cannot be deduced from the data we obtained from these Libraries. Among other important variables, the capacity and characteristics of a library's manual system, and the definition of service objectives must be considered. Although it would be particularly useful to have a number of these variables incorporated into a general planning model, each library must forecast its own future.

SYSTEM ALTERNATIVES*

The major dimensions of system choices that face a library in its planning for automation are presented in Exhibit 10. Down the left side of this Exhibit are the major software choices, representing essentially "build or buy" options:

- Purchase a software package from a commercial vendor
- Acquire software from another regional library (and modify it for another computer system and/or meet local needs)
- Develop a new software package, under the direction of the regional library, using outside consultants, library data processing personnel, or other government agency data processing personnel.

There are other possible permutations of these options. For example, a choice may be made to purchase general system software, e.g., a particular inquiry program or database management system, and use it as part of a total system that is developed by or through the library.

Across the top of the Exhibit, we have identified several choices related to computers. The dimensions in this area are more numerous and complex than in the software area. The categories reflect differences associated with the size of the computer (e.g., a mainframe or a minicomputer); location of the computer (whether on-site or remote); and its users (e.g., whether it is to be shared with others or dedicated to the library's application).

*A list of sources (both commercial vendors and Libraries) is provided in Appendix B.

Exhibit 10. Summary Presentation of Computer and Software Decisions Made by Automated Libraries

SOFTWARE	COMPUTERS			
	MAINFRAME		MINICOMPUTER	
	(Onsite, Shared)	(Remote, Shared)	(Onsite, Dedicated)	(Remote, Shared)
Purchased from commercial vendor			CA (Los Angeles) CA (Sacramento) IL* NJ NY (New York) OH (Cleveland)****	MO
Acquired from another Regional Library (and modified)		AL	FL	
Developed under direction of the Regional Library	TX	MA MI (Lansing) NY (Albany) TN WI**	OH (Cincinnati) PA (Philadelphia)*** PA (Pittsburgh)***	CO

*For the subregional libraries in the Illinois network, the computer is technically "remote."

**The computer configuration for the Wisconsin System also includes two minicomputers, which are co-located with the mainframe and also shared.

***Although the two Pennsylvania Regional Libraries shared in the development of software, it is operated independently, on a local minicomputer at each site.

****This system is not dedicated solely to Regional Library applications.

Among the 19 Libraries in this study, the most frequently selected options have been:

- Total ("turnkey") system--both hardware and software--purchased from a commercial vendor (7 libraries)
- Software developed under direction of the Regional Library for use on a shared, remotely located mainframe (5 Libraries) or an onsite, dedicated minicomputer (3 Libraries).

Only two Libraries have based their developments on the software of other Libraries.

Some of the major considerations involved in the choices made by these Libraries are discussed in the following two sections.

Cost Considerations

Sufficient data--covering hardware, software, implementation, and operations--were not available to permit a comparative cost analysis of the choices outlined in the earlier section. However, indications of the relative magnitude of some of these choices can be obtained from the data reported by a few Libraries.

Data were most readily available from those Libraries that had purchased a complete (turnkey) system from a commercial vendor. In general, they have paid approximately $45,000 for software and, depending upon the particular configuration, between $125,000 and $440,000 for hardware. The wide distribution of expenditures in hardware stems from variations in required computer capacity and peripherals, illustrated by these two examples:

$200,000. Includes a PDP 11/70 computer with 386K of memory, about 152MB disk storage, one tape drive, 14 CRT terminals, 2 printers, and 6 OCR scanners (California, Los Angeles).

$440,000. Includes a PDP 11/70 computer with 768K of memory, 228MB disk storage, one tape drive, 31 CRT terminals, 17 printers, 20 OCR scanners, and multiplexer equipment for remote access by all 16 subregional libraries in the Illinois network.

Comparable data were not always available from Libraries that had selected other options. For example, in several cases where a remotely located main-

frame is being shared, the cost of local, on-site equipment (e.g., terminals and printers) was reported to be about $45,000. In Pennsylvania, where the two Regional Libraries shared the development of software and each acquired its own dedicated minicomputer, the total cost was about $447,000. The local configurations for these Libraries is sufficiently similar so that the totals per Library are about half. In two instances where systems were developed for use on mainframes, the total software development cost for one was $25,000 and the cost for the other about $80,000. In both cases, the majority of costs reported cover data processing staff time. In one Library, the automation project was viewed by the state data processing personnel as justification for acquiring a new computer and the development costs were absorbed by the data processing department.

Over the past decade, the decision to "build" rather than "buy" software has predominated. To understand, at least in part, the basis for this trend, one must realize that a number of Libraries had no choice at the particular time the decision was made. The majority of Libraries that we studied were making their decisions between 1975 and 1977, and some as early as 1971. At that time, no commercially available software packages were available and the value of using small computers in library automation applications was only beginning to gain widespread credibility. Therefore, one of the guiding determinants was the need to develop a system that would operate on an existing government (state, county, or local) computer. Although that requirement may still exist today, it would be instructive to compare the development approach with the acquisition approach, taking into account the long-term differences in operational costs. Unfortunately, we were unable to obtain the kind of data that would have permitted such comparisons. Some data that we could obtain help to indicate the operational costs involved under various options, although even these do not necessarily reflect all of the true costs, because of differences in accounting systems maintained in the particular government agencies involved and because the impact of the system on staff costs has not always been taken into account.

For Libraries that have acquired turnkey systems, the primary operating costs, outside of staff, are for maintenance and service agreements and supplies. The costs reported by several Libraries range from $11,000

to $35,000 per year. One Library pointed out that the cost of the service and maintenance, as well as of paper and other supplies, was less than what had been spent per year on the manual system.

In one Library that uses its parent agency's computer system, the shared cost for computer maintenance and operator salary (for the Library's application) is about $60,000 per year. Another Library, which is charged for the computer resources (e.g., CPU) used, pays about $18,000 per year.

Cost comparisons, however, are only one part of any analysis of the options that are available. To the extent that a Library is able to explore all alternatives within its government agency guidelines, a number of other considerations need to be factored into its analysis.

Other Considerations

One of the major other considerations discussed by several Library personnel, including those that had selected different options, is the extent to which the Library needs to have control over its system. In two Libraries, the Directors indicated that they would not have automated their circulation functions had they been required to use another agency's computer, because of "bottom-of-the-priority-list" experiences that they had encountered or had heard about. A Director reported that one of the main benefits of visiting an already automated Library was to gain sufficient evidence of problems in the shared use of agency computers to help convince its own state data processing personnel that such an alternative was not truly feasible for the Library's service objectives.

Another factor of importance in weighing alternatives is the urgency of need and an understanding of the timeline required for development, as opposed to purchase and installation. In cases where Libraries have developed their own systems, through either outside consultants or agency data processing personnel, the range of development time has been anywhere from six months to four years. In the case of those that have acquired turnkey systems, installation and implementation have typically taken several months, with

the variations reflecting the availability of hardware and the time needed to prepare borrower and inventory data in proper computer-readable form.

If a Library is required to use a government mainframe, the options are considerably narrowed. It can undertake a total development project, with the assistance of outside consultants or agency data processing personnel, or it can acquire a system from another Library and have it adapted for the computer that must be used. There are no commercially available, off-the-shelf, programs that are truly "portable," i.e., that can be run on all mainframes. It is also important to point out that a program developed for another Library will not necessarily meet the second Library's needs and/or may not be compatible with the second Library's computer. Experience also suggests that the modification of an already existing program may involve as much work (and time) as the development of a new system.

Those Libraries that either elected or were required to select one of these two routes--to develop a new system or modify/adapt an existing system--have had mixed experiences in working with agency data processing personnel, as reflected in these comments:

> We had considerable problems with the lack of continuity in personnel. Originally, we had no full-time data processing manager assigned to us and were drawing from a pool of programmers. Eventually, we were able to obtain a full-time manager, and achieved good one-on-one communications. Written specifications and a schedule are needed if communications are not close.
>
> Communications with our data processing personnel were not difficult, but were noteworthy. Frequently we were not specific enough in saying what was needed, but repetition was the key to solving this problem.
>
> Communications were very difficult. Feel that the principles of librarianship and automation clash. It is most important that a Librarian assume the role of a system manager.

In a situation where systems work was done directly by a Library's own data processing department, the problems encountered were mainly ones of lack of time and resources, and those resulting from using another agency's computer. The Director in this situation suggested that, if a Library is required to use another agency's computer, it should get "iron-clad agreement regarding access and priorities."

In cases where development was done on contract, with outside consultants or a hardware vendor, the experiences were also mixed. In cases where problems were minimal and work progressed on schedule, it was noted that the Library Director had spent considerable time preparing for the project and had the highest respect for the consultant, and that the consultants were familiar with library service. In another case, the Library staff could not convince either the data processing personnel or the hardware vendor that had developed the program that the system was not working properly. This Director suggested that a knowledgeable person located in the Library must be responsible for managing any automation project.

There are certainly no guarantees of success or promises of problems associated with any of these choices, although the likelihood of satisfaction is probably increasing with commercial turnkey system vendors, as their systems become more stable and more completely tested in the marketplace. A number of special conditions--including good relations with data processing personnel, good computer access and support, and knowledgeable and involved library staff--are minimal requirements to help ensure success in the modification and development-from-scratch options.

IMPACT OF AUTOMATION ON STAFF AND BORROWERS

A wide variety of management styles can be found in any group of organizations. Such differences were evident in the Libraries included in this study, particularly in the areas of preparing staff and borrowers for the changeover to a computerized system.

Staff Involvement and Impact

Information on staff involvement in automation planning was sought during the interviews in seven of the Libraries. In four of the Libraries, the staff were involved in some way in preparations for the automation activity; in the other three Libraries, they were not involved. The goal of one Library Director in planning for staff involvement was to give the staff a stake in the automation and thereby add incentive to help make it work. In another, the Director wanted them to help shape the system with which

they would work. Another Director suggested that libraries beginning their planning now should "involve everyone who will have to work with the system." In one Library where there was no significant amount of staff involvement during planning and development, the new administrator noted that the staff were apprehensive about the change, about the computer, and about changing jobs.

A number of Directors mentioned an improvement in morale that resulted from the elimination of the most boring and tedious jobs. However, one Director whose staff members specialize in certain functions said that the tasks of entering patron data or requests have become very repetitive. This Director also noted, however, that there has been little staff turnover since automation, and that it has helped the Library to justify upgrading of some salaries to correspond with the new skills and functions.

Impact on Borrowers

For the 13 Libraries in which this area was discussed, 4 indicated that their borrowers were generally unaware of the changeover to a computerized system. One Director indicated that they "were trying to make the system as transparent as possible." However, in the majority of cases, where borrowers were aware of the change, the overall response is reported to be favorable, as indicated by these comments:

> Patrons like the faster service.
>
> Response has generally been positive, although people tend to blame everything on the computer, whether it was involved or not.
>
> Has inspired some patrons to take a more active role in the service, e.g., to request calendar service, as many have noticed the improved service. Negative feedback we get is generally not related to the system, although patrons, especially older ones, like to blame all problems on the computer.
>
> In fact, we are now receiving less feedback from patrons. We generally heard from them because we were behind schedule; now the major reason for contacts has been eliminated.

From an annual survey of users, one Director has been able to contrast the "before" and "after" automation responses: before, 80 percent of the patrons liked 70 percent or more of what they received; after, 74 percent of the patrons liked 70 percent or more of what they received. The Director feels that patron satisfaction has been maintained.

Some problems, such as these, were also reported:

> Readers have become more easily disgruntled knowing about the system; they blame everything on the computer, whereas they used to blame everything on the Post Office. One user called to let us know that he hated the system because the library was becoming 'cold and efficient.'
>
> While we were having system problems, patrons were frustrated (and the staff was tired of making excuses). We lost considerable credibility then but, since things have been functioning properly, we are now getting favorable feedback.

Overall, the responses from Library Directors indicate differences in philosophies regarding the need to apprise borrowers of changes in operational matters, including automation. Such differences of opinion are likely to continue, but it is worth reporting one Director's retrospective look at the way the changeover was handled: "Our mistake was in not alerting readers to the change. We missed an opportunity to gain good will and, if they had been informed of our intentions to improve the service, they would have been pleased."

IMPLEMENTATION AND STARTUP

The experiences of the 19 Libraries in moving toward operational status with their automated circulation systems varied considerably, particularly given the fact that some were involved in full system development, others in modifications or upgrades to already existing systems, and still others had acquired commercially available software at different times in the development history of those systems. We received reports from Libraries in which no major implementation problems were encountered and reports from Libraries in which major problems had been encountered; others are still in transition toward becoming operational. Although these startup

experiences were not explored in depth during the interviews, we can identify from the information that we did obtain a set of areas that must be considered in planning for implementation.

Conversion from the Manual to Computerized System

Some of the differences in approaches taken to convert data into computer-readable form are an artifact of the time at which this activity was performed. Those Libraries involved in automation prior to 1976, before the NLS/BPH MARC tapes were available and prior to the availability of Comprehensive Mailing List data, had to make other arrangements to create their basic book and borrower databases.

A number of Libraries involved in automation during the early and middle 1970s obtained copies of a basic book database that had been developed by another Library and made changes and additions, as needed. For example, among the Libraries that have acquired the DRA system, most have obtained the basic book database from others. The original client of this system acquired the NLS/BPH MARC tapes, which were converted by DRA into its system format.

Although basic book data in computer-readable form can be shared, creation of inventory data specific to each Library must, of necessity, be an individual effort. Typically, items have been coded for keypunching or the staff has keyed the data directly, from key to tape or from key to disk. In one Library, 10 clerical staff were hired to code both book and borrower data, which were then keypunched by an outside agency.

Different approaches have also been used in creating a computer-readable borrower database. In one Library, the automation project was used as an opportunity to verify all of its borrower data, and the staff made approximately 30-minute telephone calls to all readers and recorded the data on coding forms for later keyboarding. In other Libraries, borrower data were added as needed during the normal course of operations, i.e., individual borrower data were added as each reader needed service.

Very little information on data conversion costs was available but we know that such costs can be high. For those that had records of this activity, the costs for converting book inventory and borrower data were from $17,000 to $30,700. At one Library, the cost for bringing in temporary staff for coding was about $12,000, and the actual keypunching was about $2,000. At another Library, the cost (over a four-month period) for 10 extra clerical staff for coding was $25,000 and the cost of keypunching by an outside agency, at the rate of about $.05 per card, was $5,700.

The majority of Libraries visited reported that they did not maintain their manual system in parallel with startup of their computerized systems. As indicated earlier, a few Libraries had a hiatus in service, while the conversion and changeover was effected. One Library noted that, except for maintaining its 3x5 patron card file, it had no real way to keep the manual selection and circulation system operational at the same time.

In one Library the manual system was maintained during the one-month test of the automated system and, in another, it was maintained for six months and phased out completely only after one year of operation. One Library in the total set of 19 experienced such severe startup problems that a decision was made to reinstitute the manual system while these problems were being addressed.

Because of differences among the manual systems used by the various Libraries, and differences in sizes of staff, it is not possible to generalize about the requirement to maintain parallel systems for some specified period of transition. In future studies, it would be useful to document the most effective types of system check-out techniques that were devised for the test periods, to satisfy the Library staff that, indeed, they could become operational with their automated system and eliminate their manual system. Test and phase-over periods are critical in any automation project and warrant considerable attention in the planning phase.

Startup Problems

The most typical problem areas involved hardware and schedule delays. Computer downtime in one Library significantly affected testing and completion of the program and caused serious delays. In another installation, the selected computer was inadequate for the job and, after some considerable delay, the contractor was required to provide an upgraded model, at no additional cost. Another Library experienced development slippage of close to two years, because of turnover in data processing personnel assigned to the project.

In one Library, the staff indicated that they had established unrealistic timetables and that they had not taken sufficient account of the complexities involved in delivery of equipment, electrical and telephone installation, and the completion of special features in an already existing software package. The painful result of the delays has been that "the staff has now lost some of its original enthusiasm."

A typical schedule for installation of a turnkey system, once it has been selected and ordered, is reported to be as follows:

- Waiting for equipment: 6 to 8 months
- Hardware installation: 2 weeks
- Installation of software and training: 2 to 3 weeks

The total time interval before operational status will, of course, depend upon the time required for generation of computer-readable data. This has typically been from three to five months, although some Libraries have elected to prepare the computer-readable data in advance, during the period when the hardware is on order, and to have the commercial vendor convert the data to the format required by the system.

For those Libraries that acquire on-site minicomputers, the implementation schedules must also include some time for site preparation. For example, at one Library, upgrading of the electrical system was required, and

another required the installation of air-conditioning and fire-suppressant systems, as well as work to create low-static floors and fire-resistant floors, walls, and ceiling.

On the other hand, it is also important to report that the adherence to schedule at a few Libraries was quite impressive, particularly in one case where the timeline included system development and, later, conversion to an upgraded computer. In this instance, the original installation was accomplished within a month of the original six-month target, and the upgrade was achieved within one day, with no major service interruptions. In another case, the total elapsed time from system analysis and definition to operations was one year, including about three calendar months in system analysis and design; 2.3 person-years of programming; and four calendar months in data preparation and conversion.

Any discussion of startup considerations and schedules also needs to note that the automation process is generally dynamic and ongoing, requiring periodic review and evaluation. In a number of Libraries, the operational status of their systems must be described as "partial," because not all features are yet fully operational or because all databases are not yet generated for use in the system. In other cases, enhancements that involve the addition of major new features are being planned. Because compromises in system design are frequently required and additional capabilities are added as resources permit, and because needs tend to change over time on the basis of system use and experience, it is important that any overall plan provide for staged growth and change. The schedule for any changes should include sufficient time for testing and for operating a reasonable period with a stable system, prior to the introduction of any changes or new capabilities. A monitoring system for evaluating system capacities and performance is also needed, so that any requirements for additional disk storage and greater computer capacity can be determined well in advance of the projected "overload" period.

TRAINING

In most cases, training was reported to be a largely informal activity, with a focus on on-the-job, hands-on experience with the system. Although some Libraries had the data processing department personnel or commercial vendor provide some amount of formal instruction for the staff, most indicated that real learning took place individually, from reading the documentation and using the system.

In a few cases, training was more formally planned. One Library reported that, as part of the contract, the vendor provided five days of training on-site for the staff. At the request of the Director, who felt that more training was needed, another five days were added, to focus on system management. In another case, the person in charge of the system received training from the outside consultant, and then conducted training in-house for other staff members.

Clearly the amount and nature of training will need to be guided by the ease-of-use associated with a particular system and by the quality of documentation. It will also be guided by the size of staff and by the way in which the system is integrated into the Library's operations. For example, in some Libraries, the professionals have been taught to use all capabilities of the system, across all functions; in others, staff specialize in certain functions and learn only those parts of the system related to those functions. In cases where the system is being maintained on site, the training of a system operator, responsible for file maintenance and administrative management, is particularly critical.

Differences in the ways that staff positions are related to system functions deserve further exploration. It is particularly important to understand how (or whether) Library administrators are re-defining and differentiating professional and clerical positions, as a result of work changes associated with automation. As indicated earlier, we obtained exactly opposite views on the effect of automation on the staff. In several Libraries, the point was made that morale was greatly improved because many of the tedious and boring jobs had been eliminated. In another Library, which has its

staff specialize in certain areas, the point was made that the use of the system was frequently boring and repetitive. Questions related to professional roles are of general concern throughout the library profession, and the further study of experiences in the NLS/BPH community could provide useful insight into the potential effects--both positive and negative--of automation on this particular professional concern.

PART II. REFERENCE GUIDE TO BASIC CIRCULATION SYSTEM CONCEPTS

In any initial analysis of requirements, library staff will need to articulate a number of service and operational objectives that can, in turn, be translated into a set of system requirements. With each iteration in this process, the library staff is testing what is believed to be essential and desirable against what is available or possible, given the set of constraints within which the library is operating. In addition, any given requirement or set of requirements may need to be subjected to one or more trade-off analyses, to weigh the benefits of meeting particular service objectives in a specified way against the associated costs.

Although a set of requirements is embodied, de facto, in the 13 circulation systems that have been designed specifically for libraries that serve blind and physically handicapped individuals, these requirements do not represent a single, standard system design. A number of different design choices have been made by the libraries and developers of these 13 systems, and these choices have influenced the way in which the requirements are met by each system. Therefore, the presentation of requirements considerations, in the following two chapters and in Part III, reflects a wide range of possibilities.

The purpose of the next two chapters is to present and discuss a number of basic requirements considerations, as background for the more detailed presentation in Part III. In the process of conducting a system requirements study, the staff of a particular library will need to review and weigh such design considerations, to provide a framework for making the more specific kinds of choices discussed in Part III.

To facilitate such a preliminary analysis, we present in Chapter 5 of this Section the design choices that help to explain some of the differences among the presently existing systems. In Chapter 6, we illustrate how these basic design choices have influenced various hardware and software implementations.

In these two chapters, we introduce and define a set of standard terms that are used throughout the remainder of the Guide.

CHAPTER 5.
BASIC SYSTEM REQUIREMENT CONSIDERATIONS

The essential source of input into the design of any set of system requirements is the articulation of specific service and performance objectives. Although objectives that apply in a manual operating environment provide a starting point for this articulation, they need not--even should not--represent a system design constraint. Through computer-assisted circulation, it is possible to achieve objectives not possible within a manual operating environment, particularly one that is strained to capacity. On the other hand, it is important that expectations not be established whereby the computerized system is viewed as the sole means for solving essentially intellectual or staffing problems or for removing bottle-necks in areas that do not interface with and cannot be influenced by computerization.

Automated circulation systems are most typically expected to permit a library to improve its overall service through increased productivity and efficiency: by serving greater numbers of borrowers*; by increasing the speed with which items can be put into circulation; by using more effectively an entire collection; and by exerting more management control over inventory and operations. In addition, a computerized system can be used to expand the range of service modes that will be accommodated and, if well designed, can permit flexibility in serving borrowers with different and changing needs and preferences.

At some point, early in the specification of system requirements, library staff must specify quantitatively their expectations regarding the numbers of borrowers to be served and the volumes of transactions to be handled in specified periods of time. Considerations in this area are discussed further in Chapter 6. The focus of the following sections is on the definition of various modes of service and the dimensions of those modes that have implications for system design.

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*The term "borrower" is used throughout this and the following chapters to refer to both individual patrons and institutional users of the library.

TYPES OF MATERIALS TO BE HANDLED

A circulation system encompasses the following major functions:

- It provides for the storage of computer-readable data about borrowers and about items that are held in the collection.
- It supports and/or automatically performs the selection of items in that collection for borrowers, the assignment and check-out of items to specific borrowers, and the check-in of returned items.
- It maintains records, or can produce data, on borrowers, items, and circulation, to support the generation of management statistical reports.
- It provides for the generation of mailing labels and/or cards, in appropriate shelf list order.

Because the system encompasses functions relating to inventory control, it can be used to handle a wide variety of materials, including those that are not checked out, in the traditional circulation sense, but that are distributed or placed on loan. Therefore, it is reasonable to consider and to prioritize for inclusion the full range of materials that are presently represented in a library's collection. In addition, library staff will want to consider the possibility that additional types of materials will be added at a later time, given the need and the capacity to handle them.

As shown in Exhibit 11, all of the 19 Libraries included in this study plan to, or now use the system to support circulation of recorded book media--disks and cassettes. In the case of braille materials, 15 of the Libraries that handle this type of item include them or are planning to include them in their systems, and, of the Libraries that handle large-print books, 7 include them or are planning to include them in their systems. Clearly, materials in the book collection have traditionally received the highest priority, although, within this overall scheme, priorities have been established for implementation by media and by source (i.e., NLS/BPH-produced versus locally produced materials).

Exhibit 11. Types of Materials Included in the Circulation Systems of the Study Libraries

LIBRARY	BOOKS				MAGAZINES	EQUIPMENT
	Disk	Cassette	Braille	Large Print		
AL	x	x	x	N.A.	(x)	(x)
CA (Los Angeles)	x	x	x	N.A.	(x)	(x)
CA (Sacramento)	x	x	x	N.A.	(x)	(x)
CO	x	x	N.A.	-	-	-
FL	x	x	x	N.A.	x	-
IL[1]	(x)	(x)	(x)	N.A.	(x)	(x)
MA (Worcester)	x	x	N.A.	N.A.	N.A.	N.A.
MI (Lansing)	x	x	x[2]	x[2]	-	x[2]
MO	x	x	x	-	(x)	(x)
NJ	x	x	x	x	x	N.A.
NY (Albany)	x	x	x	N.A.	-	-
NY (New York)	x	x	x	N.A.	(x)	x
OH (Cincinnati)	x	x	x	N.A.	-	N.A.
OH (Cleveland)	x	x	x	N.A.	(x)	N.A.
PA (Philadelphia)	x	x	x	x	x	x
PA (Pittsburgh)	x	x	N.A.	x	x	x
TN	(x)	(x)	(x)	(x)	(x)	(x)
TX	x	x	x	x	-	N.A.
WI	x	x	-	N.A.	-	x

Legend:

(x) indicates that the Library is in the process of implementing circulation (or inventory control) for that particular type of material.

N.A. (Not Applicable) means that the particular material type is not handled by the Library; a dash (-) indicates that data were not available.

Notes:

[1] Partially operational in one subregional library; generation of databases is in progress throughout the network.

[2] Inventory control data only.

Magazine and/or magazine subscription data are handled in 4 of the 19 systems and are being prepared for inclusion by another 7 Libraries. In the estimated 14 Libraries that handle equipment, 4 Libraries presently maintain data on equipment in the system and another 4 Libraries are working to do so.

Once the materials that are to be handled in the system have been identified, one must address the requirements for specific data elements--fields of information and the design of values to be included in those fields--in the context of the total system requirements. Considerations in this area are presented in Part III, but it is important to note here that some of the data that are needed to support certain service objectives may not be available from the manual system. This may make some decisions rather difficult. For example, if a library decides to provide new choices on the frequency with which borrowers receive materials, how will the staff obtain data on their borrower's preferences, to create a new service profile? Also, if library staff want to use the system for selection assistance, is the level of detail in their borrowers' interest profiles and in the subject and other classifications provided on books adequate to support this objective?

It is clear that the internal commitment to develop and maintain the necessary data provides the foundation for achieving the library's service objectives.

SPECIFICATION OF SERVICE MODES

The circulation of materials in libraries for blind and physically handicapped individuals presumes a role for library staff in the identification of items to be sent to individual borrowers. The system can support the library staff in this selection function in a variety of ways. Therefore, the particular modes desired must be carefully specified. Circulation also encompasses the concept of continual, ongoing service, through one or more standard methods that trigger appropriate actions on the part of the library, with minimal or no requirements for the borrower to re-specify the conditions of that service. Some of the major considerations to be weighed in each design area, in the process of specifying desired service modes, are presented in Exhibit 12. In the final column, we have also illustrated some of the questions that must be addressed for particular options.

Exhibit 12. Summary of Major Considerations in Defining Selection and Check-Out Requirements

DESIGN AREA	OPTIONS*	OPERATIONAL CONSIDERATIONS
Frequency of Service (specified by borrower)	Calendar Service Turn-Around Service Will-Call Service	For Calendar Service: What frequencies will be supported: weekly? biweekly? every 3 weeks? monthly? For all service modes: What is the maximum acceptable period of time between "due for service" day and mailing day?
Check-Out Quantities (or Service Levels)	A minimum or standard number of items can be checked-out to a borrower at one time A variable number of items, specified by the library staff or by the borrower, can be checked-out at one time	If a maximum number of items is established, will the system permit the library staff to override this limit? What action should the system take when a maximum number of items has been reached for a Calendar or Will-Call service borrower?
Originator of Selection	Borrower (including "Request-Only" Service) Library Staff System ("Automatic Selection")	For Library Staff Selection: What assistance will the system provide to the staff member? For Automatic Selection: What elements of data will be used in the match between a borrower's interest profile and items in the collection? What provisions will be made for achieving variety? What provision, if any, will be made for a staff member to intervene in the automatic selection function to review the selections made by the system?

*These options are not presented as mutually exclusive choices; some combination of options can be selected.

Exhibit 12. Summary of Major Considerations in Defining Selection and Check-Out Requirements (Part 2)

DESIGN AREA	OPTIONS	OPERATIONAL CONSIDERATIONS
Maintenance of Selection and/or Borrower Request Records	Cumulative temporary file of borrower requests Cumulative temporary file of selections made by staff and/or system Both types of files	Will the staff periodically review each borrower's selection list to ensure that it has a minimum number of items that have been selected either by staff or the system? Or, will the need for additional selected items be determined at the time of automatic check-out, when the system reports on the borrowers who were assigned fewer than their minimum quantity of items to be checked out?
Selection and Check-Out Interface	Selection is a separate function, not linked in time to "automatic check-out" (system-made assignments to borrowers) Selection is the first in a series of steps leading to the automatic check-out of items	When items are selected (by the library staff or by the system), will the system report to the staff member or, in automatic selection, check the availability of a copy? Or, will the availability of a copy be checked only at the time assignments of copies to borrowers are made in the automatic check-out process?
Circulation (Check-Out) Priorities	Urgent Requests ("Reserves"), on a date (first-come, first-serve) basis By borrower order, e.g., alphabetically or by borrower ID By title order, e.g., by those with copies available, to borrowers on a date (first-come, first-serve) basis or borrower characteristic; by those titles with copies that have just been checked-in, but not re-shelved, on a date basis or by some other borrower characteristic A combination of approaches	If Reserves are accepted and maintained, what limits, if any, will be established on the number of items that can be placed "on reserve" at any given time? If limits are established, will the staff be able to override the limits? What elements of book and borrower information, and what file structures and/or sorting routines, are needed to support the desired processing sequence in automatic check-out?

The set of decisions that are made with respect to these various areas of system requirements provide the initial framework for system design. These areas are discussed in the following three sections: Frequency of Service and Circulation Service Levels; Major Characteristics of the Selection Function; and Selection and Automatic Check-Out.

Frequency of Service and Circulation Service Levels

The set of choices for periodicity in circulation service to borrowers includes the following:

> Calendar Service. Provides for circulation of items on a fixed-calendar schedule (e.g., weekly, biweekly, every three weeks, or monthly), to accommodate the reading rates of individual borrowers.
>
> Turn-Around Service. Provides for circulation of a new item to a borrower for each checked-out item that is returned by that borrower.
>
> Will-Call Service. The provision of one or more items, to be circulated only when the borrower contacts the library for service.

Each of these options is, in turn, related to a concept of service levels--quantities of items to be in circulation, per borrower, at a given time.

In the case of Turn-Around service, a minimum or standard number of items for check-out is established initially and, thereafter, the service level is controlled through the process of circulating a new item for each returned item. With Calendar Service, additional management controls are needed in the system design if there is to be a maximum number of items for a given borrower in circulation at any given time. The items in circulation may begin to cumulate if a fixed number of items is being sent out at each service date, but items are not also being returned. With Will-Call Service, the problem of maintaining service levels is not present, but a decision must still be made on whether to impose a maximum on the number of items that can be checked out at one time.

In all cases where administrative limits are established in the system, e.g., on the maximum number of items that can be checked out per borrower, a related set of design considerations must be addressed, including these: specification of actions that will be taken by the system when an administrative-limit condition occurs; how the staff will be notified through the system that a particular limit has been reached; and whether provision will be made for a staff member to override any administrative limits, to accommodate special circumstances and borrowers.

The Will-Call service borrowers and on-site borrowers also pose another set of considerations relating to system requirements for flexibility and multiple modes of operation. In most systems implemented to date, the majority of borrowers are served through automatic processing on some regular schedule, e.g., daily or every few days, of groups of borrowers due for service. The programs that handle check-out are executed in a set of operations performed "offline" (i.e., in a batch, rather than interactive, mode). However, the types of borrowers identified above and others, as well, can be thought of as having on-demand service needs. Therefore, the library staff will want to consider whether the system is to handle groups of borrowers who are due for service and single borrowers in one-time or exceptional situations. If on-demand service is to be provided, then the system must also provide for an online, interactive means for the library staff to request that the selection (as appropriate) and check-out functions be executed.

Major Characteristics of the Selection Function

A unique aspect of service in libraries for blind and physically handicapped individuals is that circulation involves not only filling requests for titles that have been specified by borrowers (e.g., "Request-Only" borrowers), but also providing items that have been selected for borrowers, by a library staff member frequently referred to as a Reader Advisor or Selector. The percentage of borrowers who need or prefer this selection service can be quite significant (e.g., 80 percent) in some libraries.

A number of possibilities present themselves in specifying the way in which a computerized system can help in this selection function. They range from a totally system-managed and system-controlled approach, with a sophisticated type of automatic SDI (Selective Dissemination of Information), to one in which the system does no more than permit the library staff to key in the items that they have selected for check-out, using the same capabilities established for handling requests for titles made by borrowers. A number of factors--including numbers of staff, service characteristics of a particular borrower population, and the volume of transactions to be handled, in relation to various periodicities--need to be weighed in defining the extent to which the system is to be actively involved in this function. One of the most critical requirements decisions has to do with determining what "judgments" the system will be programmed to make and what judgments will be left to staff members. Other operational considerations are introduced below.

Origination of Selection. At a minimum, the selection function typically provides for the entry of data on titles that have been requested by borrowers or identified by the staff through some manual means. Any additional requirements reflect choices along a continuum--from fully manual to fully automatic--choices that must take into account the originator of the selection and the role of that originator.

When the staff member is the originator of a selection, the role of the system can be to assist the staff member in creating a subset of titles in the collection that are potential matches. From this subset, the staff member can make final choices on the basis of apparent relevance (judged by reading the title and/or annotation) and can also introduce other considerations, to provide variety. Among the questions to be asked in this area of design are:

- Which elements of information supplied in the borrower's interest profile and in the record for each title will be used by the system to create an appropriate subset of the holdings?

- Which elements of data will the staff member want to review in the list of potential matches to make the final selections, and how many items will the staff member want to view to make those selections?

A number of data elements that can be used for these purposes are described in detail in Part III. The most important of these are presented in Exhibit 13.

To take the requirements resulting from staff-originated selection the next step, to a total automatic selection process, the library staff may need to establish additional principles for the matching process and decide how the system will provide for variety among the items selected and/or will reflect specified preferences of the borrower (e.g., in the case where a borrower prefers to receive more mysteries than historical fiction).

A particularly critical issue in automatic selection is whether the selections made by the system are truly final or a staff member will "intervene" to review the items selected and make any needed revisions. The concept of interactive automatic selection lies somewhere in the middle on the continuum between a staff-selection approach and a system-selection approach. If staff intervention is not provided as a means to identify and correct poor matches, then a library will need to invest more resources in a mechanism for system evaluation, to test periodically the quality of matches that are being generated by the system.

As indicated in Part I, a few Library Directors expressed concern that, with computer-assisted staff selection, the staff tended to lose its familiarity with items in the collection. In the manual operating environment, staff members handle printed tools and skim annotations, in the process of selecting items. One way of thinking about the effect of dealing with computerized records is that the database tends to become an "invisible" medium. In skimming through printed materials, one can absorb, almost unconsciously, the essence of the information but online technology does not promote that type of skimming and unconscious learning. Online technology can, in fact, create some feelings of distance between the staff member at the terminal and the information in the databases. Therefore, in parallel with considerations of these several design choices, library staff will also want

Exhibit 13. Set of Major Data Elements To Be Considered for Use in Computer-Assisted Selection

Part 1. Matching Criteria

A. Possible Inclusion Criteria

1. Book medium (Disk, Cassette, Large Print, Braille, Double-Vision)
2. Subject (e.g., insurance) and type (e.g., mysteries) terms (or codes)
3. Reading level
4. Language
5. Books in series

B. Possible Exclusion Criteria

1. Borrower acceptance of staff or system selection
2. Content characteristics (e.g., contains violence, explicit sex)
3. Borrower has already read (determined from a record of "Has-Had" information)
4. Borrower has now (determined from a record of "Has-Now" information)
5. Narrator characteristics (e.g., male/female, accent)
6. Book length (long/short)

Part 2. Additional Fields To Be Used for Display by Staff in Selection

1. Title
2. Annotation
3. Borrower Notes
4. Author
5. Narrator
6. Other titles on the same disk or cassette
7. Re-issue information (to select latest version of a re-issued book)
8. Number of requests currently pending for a book (to select books with good chance of availability)
9. Number of copies available for check-out

to envision staff procedures and system-user interfaces that are designed to enhance interaction with the information, e.g., through the provision of flexible and simple means for viewing selected amounts and parts of a given database.

Selection in Relation to Check-Out. Many of the systems that have been developed to date have been designed to provide automatic check-out, particularly in a batch process, of items for groups of borrowers. This processing can be done in the late afternoon or evening, for example, or on some regular schedule. These systems vary in terms of the role of selection within the check-out function. In some systems, selection is viewed as a separate function and is not linked in time with the execution of the check-out function. In these systems, the selection function is a means for generating, in advance, a temporary file ("bank") of items that have been selected--by borrower, by staff, or by the system, automatically--and that can be drawn upon at the time of check-out, when a particular individual or group of borrowers is due for service.

In other system implementations, automatic selection is viewed conceptually as one of a series of steps that comprise the check-out function. For example, when the automatic selection step is executed, only those items for which copies are avilable for circulation can be selected, within the framework of other selection principles that have been established. The available items are then processed through in the other check-out steps performed by the system.

These two models do not represent mutually exclusive choices but, rather, alternative ways of specifying the functions within a system and the interface between functions. In any given system, the selection and check-out functions may be designed to be executed both independently and in combination.

With the typical check-out program, the availability of an item must be checked before the item is assigned to the borrower and records of that assignment are made. Therefore, if a number of borrowers are waiting to receive a

certain title, the system must be programmed to follow a certain set of principles in working through the list of borrowers due for service. The choice of principles to be followed depends on the answers to questions such as these:

- Will a "Reserve" system (i.e., records of urgent requests that have been placed by borrowers) be maintained?
  - If so, will Reserves be fulfilled first?
  - If more than one borrower has reserved a given title, will the available copies in each medium be checked out on a first-come, first-serve (i.e., date-order) basis, or on some other basis?

- In what order will the system perform check-out from the request and selection (referred to as a Request File) lists?
  - By borrower:
    - Alphabetically
    - By Borrower ID
    - According to service mode, e.g., Turn-Around Service Borrowers first, etc.
  - By title (or title, per medium):
    - First come, first-serve basis (according to date requested by borrower or selected by staff or system)
    - First those titles of copies that have been checked in, but not yet re-shelved, followed by titles, in some other order, that are in the Request File
    - Titles with the most number of copies that are available, in descending order
  - By some combination of these or other prioritizing schemes

These sets of choices raise a number of considerations and additional questions, some of which can be answered only by careful weighing of the likely impact on service of the choices made. For example, the automatic check-out program

deals with a number of different types of borrowers, whose lists of possible items to be received have been generated in different ways, e.g., requested, or perhaps urgently requested by the borrower, or generated by a staff member or by the system itself. Given this variety, are there conditions under which preferential treatment is desirable, e.g., for borrowers with Reserve items on file? Also, it is sometimes difficult to identify items that have not been read by borrowers who have been receiving service over a long period of time. An ordering by sequentially assigned Borrower ID can help to ensure that their requests or selections are fulfilled, because copies are more likely to be available if these borrowers are processed first by the system. Is this a defensible type of preferential treatment?

Another set of questions has to do with the role of recently returned material. Will the immediate re-circulation of titles for which copies have been returned but not yet re-shelved save sufficient time in shelving to counter the disadvantages that accrue from having the same set of copies circulate more (and, perhaps, deteriorate more quickly) than other copies? And, will the advantages outweigh the disadvantages of processing the returned items first and, perhaps, underutilizing some of the titles in the collection?

The answers to these and other questions need to be determined in the context of particular implementation alternatives. In any system development effort, considerable thought needs to be given to implications of various options in the structuring of files (and their attendant storage costs) and to the complexity of program routines and required computer resources. In evaluating already available systems, library staff will need to work initially within the framework of answers that have already been developed and decide, in the course of the evaluation, on the adequacy of these answers in reflecting the library staff's current preferences and needs.

THE SYSTEM-USER INTERFACE

As already noted earlier, it will be useful for the library staff, in the process of identifying its requirements, to envision the procedures that will be followed by different members of the staff. The requirements for desired

characteristics in the interface between the library staff and the system can be more clearly envisioned if they are considered when outlining the approach to be used in integrating a system into the library's operations.

Some interface principles need to be established to cover the total system. To develop these principles, questions such as the following must be considered:

- Will processing of functions be accomplished online, in batch mode, or in some combination? That is, will some or all functions be performed online, e.g., for immediate response or immediate (real-time) updating, or will some functions be reserved for batch processing, primarily when all users of the system are not performing other operations?

- If online access is to be provided, will the speed of the terminal be 300 baud (i.e., 30 characters per second) or will the requirement be for higher speeds, such as 1200 or 9600 baud?

- Will system responses be provided on a line-by-line basis, or will full-screen operations be supported? For example, will the system fill up an entire screen of information and let the users page back and forth through several "screens," without having data scroll off the top of the CRT?

- How interactive and helpful will the system be? Will it provide prompts to the terminal user for each successive action that is needed to perform a particular function? For the creation of a new book or borrower record, will the system provide a fill-in-the-blanks screen, showing exactly where the user is to provide the required data? How "smart" will the program be in checking for certain types of errors and providing feedback to the system user on the nature of those errors?

- Will the system be operated by a set of commands covering the range of functions that a user can request the system to perform,

or will the system provide a menu of choices from which the user selects an option by some reference number? Is some combination of approaches desired?

For specific system functions, additional questions must be answered to arrive at interface specifications. For example:

- How will the library staff gain access to information in the borrower (or book, equipment, and magazine) database?

- Which elements of information (e.g., ID; name) will be used to gain access to a particular borrower's record?

- How will the user request to see the records of a group of borrowers, according to certain characteristics, e.g., preferred service mode or borrowers due for service?

- In reviewing a borrower record online at the terminal, can the user specify the groups of data elements, e.g., Has-Had ("already circulated") or interest profile information, to be viewed?

One way in which the library staff can derive this particular set of requirements is to pose questions that staff members will want to be able to answer by using the system. For example, in situations where a librarian wants to determine whether a borrower has already read a particular item, will the system give the system user the answer to this question: "Tell me--yes or no--whether Borrower A now has or has had Title X." The design implications for answering this question are very different from those required for answering the following question: "Let me see the Has-Now and Has-Had information for Borrower A, so that I can see whether Title X is on either of these two lists."

CHAPTER 6.

CONSIDERATIONS FOR IMPLEMENTATION

During the iterative process of reviewing the basic requirements considerations outlined in Chapter 5, library staff will face a number of complex decisions regarding alternative ways of implementing a given design. Since the requirements themselves are complex and since there are major differences among the systems that have already been developed, it is not possible to present a generalized set of implementation guidelines. The range of options available for implementing any given set of requirements is very wide and, particularly if a new system is to be developed, many issues will need to be considered in selecting a computer, storage devices, terminals, and other peripherals. In this Chapter, we discuss some of the major issues and then describe several systems to illustrate specific implementations.

HARDWARE CONSIDERATIONS

Computer Capacity

The computer capacity needed to perform the tasks associated with automated circulation depends on the specific functions to be performed by the system and on the efficiency of the programs being used. Once the library staff have decided on a basic set of functions that the system is to perform, and on the likely volume of activity, they will need to select a computer with enough capacity to support those functions in accordance with their expectations for performance. There is no single, agreed-upon measure of computing power, but benchmark studies of the performance of many different computer configurations are available from manufacturers and independent associations. These can be useful in providing rough measures of computer power.

Careful study will be needed to determine the amount of memory required to support a particular circulation system, including the desired number of terminals. In dedicated, turnkey systems, this study will have already been done, and the minimum requirements for particular computers will have been specified. In adaptations of existing systems, whether on the same or different computers, the problem of determining memory requirements is more complex,

particularly if there is a need to share memory and service priorities with other applications.

It is generally recognized that the selection and check-out functions require the most significant amounts of computer resources. Considerably fewer resources are needed to enter data, update databases, and perform such tasks as OCR-scanning of returned books for check-in. Since the selection and check-out functions are complex, in terms of the intricacy of the programs, and they must deal with varying numbers of borrowers to be served and varying numbers of items to be circulated, these functions are the most important ones to consider in establishing computer capacity requirements. As illustrated by the examples in Exhibit 14, a wide range of combinations of computers and memory are currently serving the needs of the Libraries. There is no obvious correlation between circulation volume and either computer capacity or memory size.

Exhibit 14. Computer Capacity vs. Volume of Circulation

Circulation Volumes	Minicomputer	Mainframe
Small	COLORADO (uses 312K on a Hewlett Packard 3000 to circulate 187,000 items annually)	ALABAMA (uses a 1MB partition on a Univac 90/80 to circulate 76,000 items annually)
Large	PHILADELPHIA (uses 96K on a PDP 11/35 to circulate about 583,000 items annually)	TEXAS (uses 332K on an IBM 360/40 to circulate 860,000 items annually)

The multiple installations of the DRA system provide a means to make more direct comparisons of computing capacity and volume of circulation. By eliminating software as a variable, it is possible to obtain a clearer picture of the factors affecting the memory requirements of a system. Exhibit 15 lists the libraries using the DRA system in order of the number of terminals currently in use. From this list it is clear that, in general, total memory requirements are affected more by the number of terminals to be supported than by the volume of items to be circulated.

Exhibit 15. Operating Environments of the DRA System

Library	Computer	Memory	Number of Terminals	Number of Borrowers	Annual Circulation
New York City	PDP 11/70	256K	--	16,400	247,000
Missouri	PDP 11/70	896K	7	7,300	318,000 (1)
Sacramento	PDP 11/70	320K	11	9,000	439,000
Braille	PDP 11/70	396K	14	13,700	390,000
Illinois	PDP 11/70	768K	31	13,300	423,000
Cleveland	PDP 11/70	2000K	32	12,000	390,000 (1)

Legend:

-- = Not available

Note:

(1) Several library applications are supported at their installations.

If a library shares a computer with another library or agency (e.g., a state data processing center), it may not need to define its equipment requirements as specifically as it would for the purchase of new equipment. For example, the Alabama Regional Library does not monitor closely the amount of memory its system uses because its programs operate in a large (1MB) partition of the 3MB memory on the State's Univac computer.

Storage

When the design of each database has been planned and the size of the collections (books, magazines, and/or equipment) and borrower population are known, the library staff will be able to estimate the amount of storage that will be required. If fixed-length records are being used to store information on borrowers, books, magazines, and/or equipment, this calculation will be straightforward. For systems using variable-length records, the library staff will have to do some estimating or sampling to determine the average size of records containing the typical information on each borrower, book, magazine, and equipment type. In addition to the amount of storage required for this "raw" data, additional storage is needed for index "overhead," i.e., the space that the computer needs to store its information for finding records in the databases. If inverted indexes

are used, overhead may increase storage to two or three times the space needed for the raw data. Space must also be available for the system to store its temporary working and transaction files.

We were not able to obtain sufficient data on storage requirements to draw conclusions on the relationship between the size of databases and storage requirements. Exhibit 16 illustrates variations in the storage required for general borrower information, in several Libraries.

Exhibit 16. Typical Storage Requirements for General Borrower Information (in bytes)

DATA ELEMENTS	AL	CO	DRA	FL	MA	MI	NJ
Borrower ID (local)	5			11	8	5	6
Borrower Name	26	20	40		21	26	34
Street Address	2x19	2x20	3x40	2x30	2x21	2x19	2x34
City	15	18	25	20	14	15	20
County	2		3			2	
State	in Ci	2	2	2	2	in Ci	in Ci*
Zip Code	5	5	9	5	5	5	6
Telephone	10	7	14	10	12	10	16
Alternate Street Address	2x19		3x40			2x19	
Alternate City/State	17		28			17	
Alternate Zip Code	5		9			5	
Dates for Alternate Address	8					8	1
Birthdate	6	2	10	6	6	3	6
Sex	1	1	1		1		1
Handicap(s)	1	1	6	15	1	1	1
Borrower Type Code		1	3		1		1
Staff Advisor			3				12
Library That Serves Borrower	2					2	
Date First Served/Entered	6	6	10			6	6
Notes	34		319		1	34	
TOTAL NUMBER BYTES	219	103	722	129	114	215	178

*In Ci: means that the state is included in the City field.

Terminals and Other Peripherals

The working environment in which the system will be used has important implications for the number and variety of terminals, printers, OCR scanners, and other peripherals that will be needed. As reported by many of the Libraries that we visited, a typical day for staff members involves use of the system to perform several different functions, including retrieval and display of borrower and book information, keying in of borrower requests, maintenance of the databases, selection, and, in some cases, keying in of book numbers for check-in and check-out. The number of terminals needed will depend on how many of the staff members need constant or unpredictable access to the system. In most of the Libraries, the terminal is a basic tool for librarians who are Reader Advisors (or Selectors), and it is not efficient to have these librarians share terminals with clerical personnel. The numbers of terminals needed for the support staff, on the other hand, can be controlled to some extent through scheduling, to make it possible for these personnel to perform a variety of tasks (e.g., data entry, database updating) on terminals that are shared. The physical arrangement of the library may also have an impact on the need for terminals, because the productivity of staff can be greatly reduced if a person has to go to another part of the library to use a terminal. Exhibit 17 shows the numbers of terminals used by the Libraries relative to their total staff size.

Where libraries are using computer facilities that are remote from their own location, consideration should also be given to the need for having a line printer or a hardcopy terminal on-site. Some Library staff members reported that the turnaround time for obtaining hardcopy listings from a remotely located computer facility ranged from one to several working days, which represented a problem because they frequently need to obtain reference or statistical listings during the day. For these Libraries, the on-site printer eliminated the problem. In Libraries with on-site computers, the staff also noted that hardcopy printers were a requirement.

Exhibit 17. Numbers of Terminals and OCR Scanners by Library and Staff Size

Library[1]	Total Number of Staff	Number of Terminals	Number of OCR Scanners
MA (Worcester)	3	4	-
CO	10.5	3	-
OH (Cincinnati)	11	4	-
WI	13	4	-
TN	13	7	2
AL	15	6	-
MO	18	7	3
PA (Pittsburgh)	19	11	-
OH (Cleveland)[2]	19.9	32	3
MI (Lansing)	22	NA	-
CA (Sacramento)	23	11	3
NY (Albany)	25	8	-
NY (New York)	25	NA	7
PA (Philadelphia)	27	13	-
NJ	28	4	-
FL	29	3	-
IL[3]	29	8	4
CA (Los Angeles)	30	14	6
TX	43	12	-

Legend:

NA = Not Available

Notes:

[1] The Libraries are presented in order of staff size, from the smallest to the largest.

[2] Several applications are supported in this installation.

[3] Numbers of staff terminals and scanners are for Chicago only.

ILLUSTRATIVE IMPLEMENTATIONS

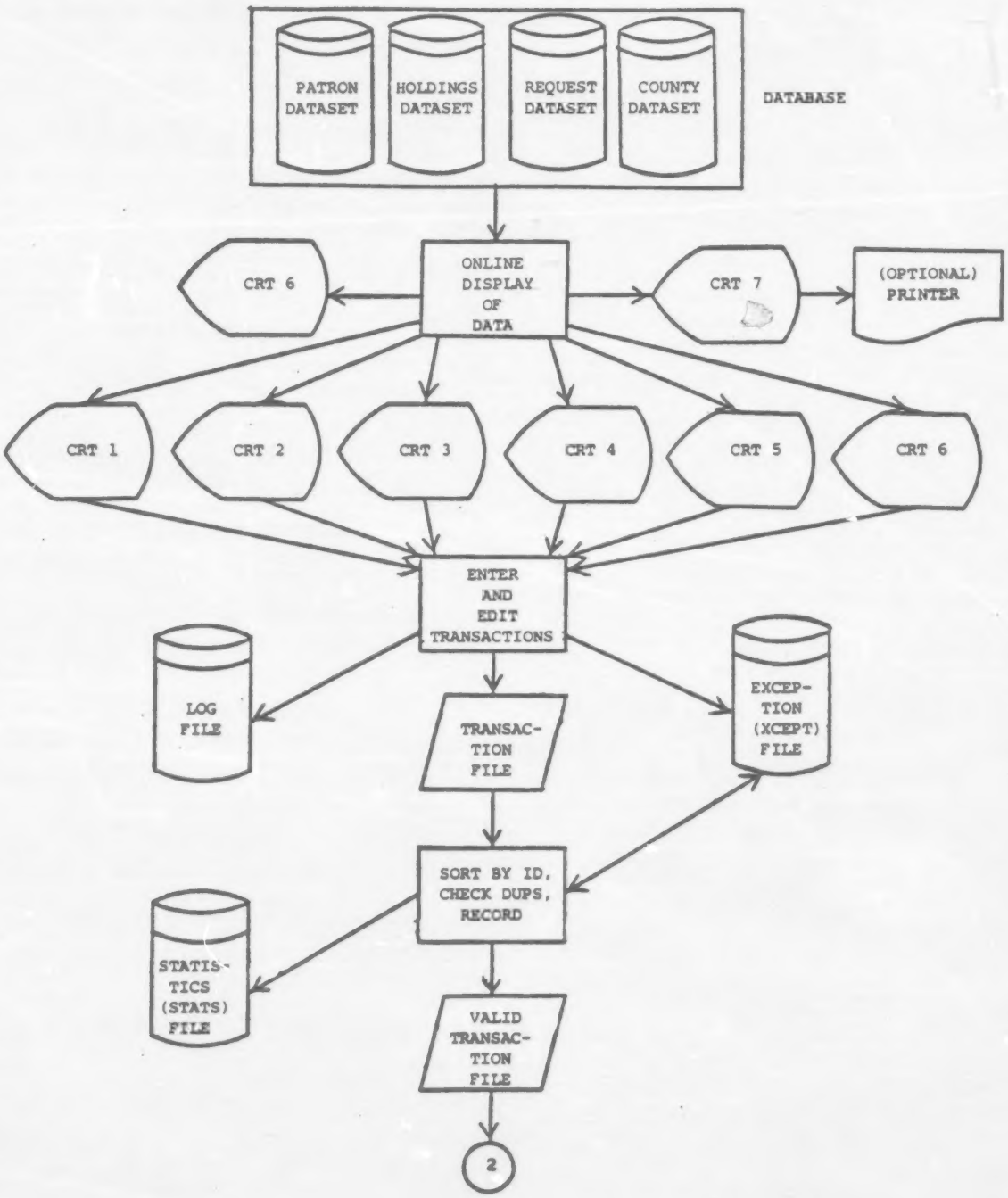
In this section we provide synopses of three automated circulation systems. The systems illustrate various methods of file organization and processing steps. These mini-descriptions have been assembled to provide an overall understanding of how the various components--databases and functions--relate in the flow of selected systems. These particular examples also help to illustrate significantly different implementations. Additional examples, from these and other systems, are provided in Part III of this Guide.

The New York (Albany) System

Exhibit 18 contains a schematic representation of the databases used in, and functions performed by, the automated system in Albany, New York. The basic data used in this circulation system are divided into four datasets (files): the Patron Dataset, the Holdings Dataset, the Request Dataset, and the County Dataset. This system is one of a number of applications that operate on the State Education Department's Burroughs B7765 computer. The Library has 7 Hazeltine 2000 CRT terminals and a GE Terminet 1200 printer on-site for use by staff during normal daily working hours.

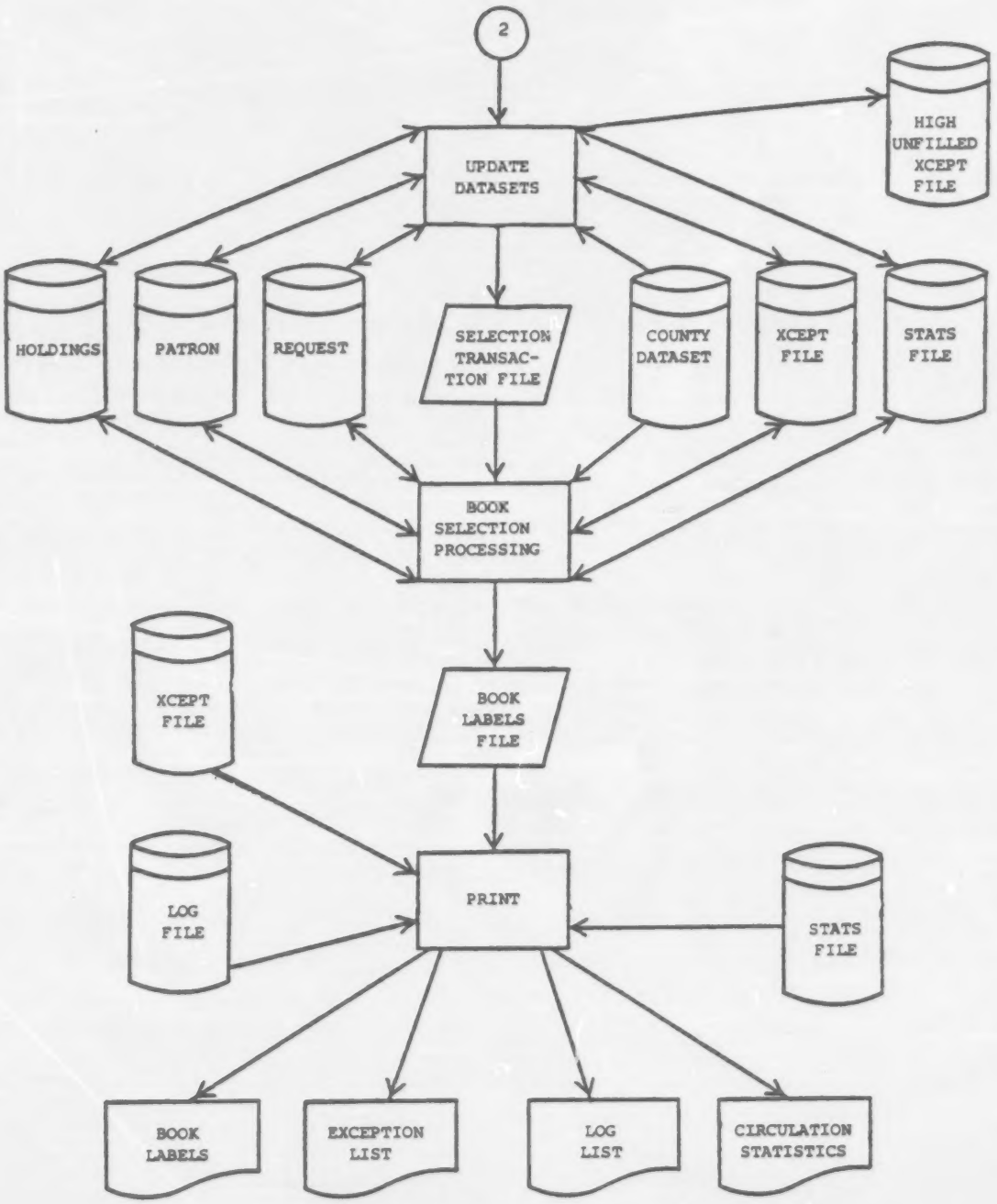
The Patron Dataset contains patron and institution profile information on all registered borrowers. The basic components of this information are as follows: (1) patron ID number, name, telephone number, birthdate, and date of registration; (2) address; (3) service information, including frequency, quantities, media, and machine ID numbers; (4) additional patron records containing data on reading preferences. The Holdings Dataset contains one record for each title in each medium. These records include information on the total number of copies owned and the number of copies that are on hand. The Request Dataset contains information on book requests categorized by three different types: (1) unfilled requests--items requested by a patron but not yet received; (2) filled requests--items currently in a patron's possession; (3) history requests--items returned by a patron. The most current three months of history information are maintained on

Exhibit 18. Flow Chart for the New York (Albany) System (Part 1)



Prepared By: New York (Albany) Regional Library

Exhibit 18. Flow Chart for the New York (Albany) System (Part 2)



file for access by Library staff. The remaining information is stored on magnetic tape. The County Dataset is used in the verification of input of county information. Using CRT terminals, the Library staff enter additions, changes, and deletions. Valid records are stored on a disk for later offline updating of the database. All invalid records are reported in printed listings, arranged in order by CRT (terminal) number, for subsequent correction and reentry into the system.

The offline processing of these daily transaction records involves the following processing functions:

1. Changes processed in the Holdings Dataset include addition of new titles, adjustments for returned books--both damaged and undamaged--and books checked out to walk-in patrons.

2. Changes made to the Patron Dataset include the addition, modification, and deletion of patron profile information.

3. Returned books are checked in by being processed against the Holdings Dataset. The status for a returned item is changed from "filled" to "history" in the Request Dataset.

4. The Patron Dataset is checked daily for such action items as patrons due for service, termination of temporary suspensions, and patrons with no unfilled requests.

5. Books are selected for check-out by matching patron requests against the available inventory information in the Holdings Dataset.

6. Mailing labels are produced.

7. Circulation statistics are compiled.

8. Various reports on the activities within the offline processing cycle are printed.

Through a retrieval program, Library staff can access information in the three main datasets. The output is formatted on the CRT screen for easy recognition of individual data items, and paper copy may be obtained through a printer connected to one of the CRTs. The basic search command includes a two-character code for identifying the dataset to be searched and the unique ID of a patron or book. The system also permits staff to conduct name searches for an individual or institution.

Among the specific advantages and special capabilities of this system, as cited by the Library, are:

- Special reports listing high-demand items (so that tape duplication can be instituted on the basis of known requests)
- Daily reports highlighting potential problem areas in the files or in service
- Mailing labels printed in an order that facilitates the retrieval of items from the Library shelves
- Improvement in control over materials to maximize use of Library resources
- Satisfactory capacity for growth; the number of patrons served can increase without degrading the efficiency of the system
- Inventory lists for each media type to assist in making adjustments to holdings
- Special programs (presently fifteen in number) to generate information for statistical purposes or to monitor system usage and growth of information in the datasets

In January 1981, a number of enhancements were made to increase system processing efficiency and add certain features, including accommodation of a 9-digit ZIP code; production of book labels for each container of a multi-container book; and generation of a list of patrons who have a high number of unfilled requests.

The Florida System(s)

The automated circulation system used by the Florida Regional Library is currently being upgraded from an IBM System 3 to an IBM System 34 minicomputer. The original system operates in a non-interactive mode; interactive inquiry and display capabilities are being installed in the upgraded system. Exhibit 19, Section 1, shows the prototype display screen for reader (borrower) information. The prototype display for requests or history (Has-Had) data is shown in the same Exhibit, Section 2.

The basic data used in this circulation system are stored in four files: Reader, Book, Request, and History. The Reader File contains a fixed-length record for each reader. It includes the Social Security number, name, address, birthdate, date of registration, acceptable media, dates first served in each medium, desired quantity in each medium, and notes. The Book File consists of fixed-length records for each book. A record contains book number, title, author, inventory data (e.g., number of copies owned, number of copies available), and circulation statistics (e.g., month-to-date, year-to-date). The Request File contains the book numbers of items requested by each reader and the History File contains the book numbers of all items a reader has ever received.

Modifications to the Reader and Book Files are recorded on coding forms (see sample in Exhibit 20) by the library staff and are keypunched onto cards. These cards are sorted by reader or book number prior to processing. Reference listings are produced showing the content of each record before and after modification. As shown in Exhibit 21, a listing indicates, with asterisks, the data items that were changed.

The Library provides Turn-Around service to all readers and only books that have been requested by a reader will be sent. Because book selection service is not provided, the Request File record for each reader must be maintained at a specified level, for service to be provided. The status of reader requests and the number of items in circulation are constantly monitored. Listings of readers needing additional requests are produced regularly, for use by the Reader Advisors.

Exhibit 19. Prototype Screen Displays for the Upgraded Florida System

1. Reader Profile Data

```
**********************************************************************************
**                                                                              **
**          PRINT KEY FROM-WI          BY USER-GRE        01/16/81    14.22.05  **
**                                                                              **
**********************************************************************************


   RINQ2
                          R E A D E R   P R O F I L E

      READER NO. **********    PHONE **********          DELETED **********

      **********************************    HANDICAP **********
      **********************************          TBS    CBS    BR     MAGS
      ********** ** *****    READS  *******  *******  *******  *******

                    TBS    CBS    BR   TOTAL
   NOT ISSUED       ***    ***    ***   ***      BIRTH DATE  **********
   ON HAND          ***    ***    ***   ***      REGISTERED  **********
   TO BE ISSUED     ***    ***    ***   ****     START TB    **********
   MONTH TO DATE    ***    ***    ***   ***      START CB    **********
   LAST ISSUE       *****  *****  *****  **********START BR   **********
   LAST RETURN      *****  *****  *****  **********STOP ALL    **********
   OPEN REQUESTS    ***    ***    ***    ***      START ALL   **********
   CIRCULATION      ***    ***    ***    ***
   SNAGS ***        WALKINS ***
   SUBREGION        **  **********************
      R E Q U E S T S    H I S T O R Y
    * TALKING BOOKS     * TALKING BOOKS     * NEXT READER
    * CASSETTES         * CASSETTES         * END OF JOB
    * BRAILLE           * BRAILLE
```

2. Requests/History Data

```
**********************************************************************************
**                                                                              **
**          PRINT KEY FROM-WI          BY USER-GRE        01/16/81    14.15.36  **
**                                                                              **
**********************************************************************************


   RINQ3          **********************************************

   READER NO. **********    **********************************

   ******** ******** ******** ******** ******** ******** ******** ******** ********
   ******** ******** ******** ******** ******** ******** ******** ******** ********
   ******** ******** ******** ******** ******** ******** ******** ******** ********
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   ******** ******** ******** ******** ******** ******** ******** ******** ********
   ******** ******** ******** ******** ******** ******** ******** ******** ********
   ******** ******** ******** ******** ******** ******** ******** ******** ********
   ******** ********
      R E Q U E S T S    H I S T O R Y
    * TALKING BOOKS     * TALKING BOOKS     * NEXT READER
    * CASSETTES         * CASSETTES         * END OF JOB
    * BRAILLE           * BRAILLE
```
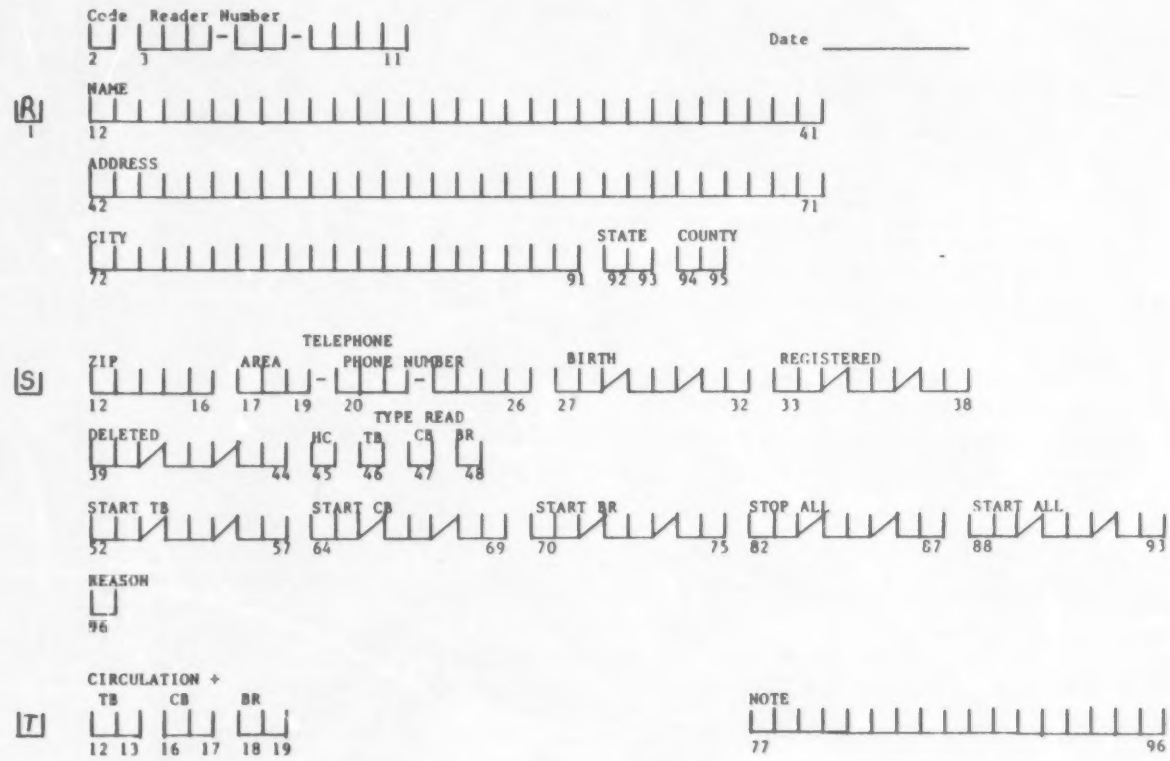

Exhibit 20. Coding Form Used for Reader File Data from the Original Florida System

THE FLORIDA REGIONAL LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED

READER FILE MAINTENANCE



(USE FORM #131 FOR CIRCULATION ADJUSTMENTS)

Exhibit 21. Sample Reference Listing of Modified Reader File Data Used in the Original Florida System*

	READER	TB	CB	BR
WAS	204-16-**	16	7	0
NOW	204-16-**	16	517	0

	READER	TB	CB	BR
WAS	206-36-**	0	6-	0
NOW	206-36-**	0	6	0

	READER	ZIP	PHONE	BIRTH	REGSTER	DELETE	H	SERVE	CB	BR	STOP ALL	START ALL			
WAS	210-50-**	33154	305-861-**	5/29/59	7/15/80	1/16/81	V	R	R	52/00/00	0/00/00	0/00/00	0/00/00	0/00/00	3 520	DELETED
NOW	210-50-**	33154	305-861-**	5/29/59	7/15/80	1/15/81	V	R	R	52/00/00	0/00/00	0/00/00	0/00/00	0/00/00	3 520	DELETED

	READER	TB	CB	BR
WAS	224-01-**		514	0
NOW	224-01-**		524	0

WAS	233-24-**	ALBERTSON **			**	7TH ST NO				ST PETERSBURG		FL 04				
NOW	233-24-**	ALBERTSON **			**	7TH ST N APT **				ST PETERSBURG		FL 04				

WAS	252-84-**	CARTER **			RT**	BOX **				YULEE		FL 41				
NOW	252-84-**	CARTER **			RT**	BOX **				YULEE		FL 41				

	READER	ZIP	PHONE	BIRTH	REGSTER	DELETE	H	SERVE	CB	BR	STOP ALL	START ALL			
WAS	252-84-**	32067	904-261-	0/00/00	11/26/79	0/00/00	L	R	R	51/00/00	0/00/00	0/00/00	0/00/00	0/00/00	510	
NOW	252-84-**	32097	904-261-	0/00/00	11/26/79	0/00/00	L	R	R	51/00/00	0/00/00	0/00/00	0/00/00	0/00/00	510	

	READER	ZIP	PHONE	BIRTH	REGSTER	DELETE	H	SERVE	CB	BR	STOP ALL	START ALL			
WAS	265-80-**	32720	904-734-	2/03/12	10/31/78	1/16/81	V		R	0/00/00	0/00/00	0/00/00	0/00/00	0/00/00	3 50	DELETED
NOW	265-80-**	32720	904-734-	2/03/12	10/31/78	1/15/81	V		R	0/00/00	0/00/00	0/00/00	0/00/00	0/00/00	3 50	DELETED

	READER	ZIP	PHONE	BIRTH	REGSTER	DELETE	H	SERVE	CB	BR	STOP ALL	START ALL			
WAS	256-03-**	33801	813-858-	2/24/12	3/31/80	0/00/00	V		S	0/00/00	0/00/00	0/00/00	0/00/00	0/00/00	50	
NOW	256-03-**	33805	813-858-	2/24/12	3/31/80	0/00/00	V		S	0/00/00	0/00/00	0/00/00	0/00/00	0/00/00	50	

*Modified data are highlighted by an underscore of asterisks.
**Personal identifying information has been removed.

Exhibit 22. Example of Inventory Adjustments Recorded in Book File After Check-Out (Florida System)

ADDAVL BOOKS ADDED TO AVAILABLE IN BOOKFILE 1/16/81 PAGE 1

BOOK#	OLD	ADD	NOW	TITLE
113648	0	9	9	CAREW
113679	9	10	19	MOTHERS AND DAUGHTERS
113010	0	9	9	MOMO
114043	13	12	25	IN HIS FOOTSTEPS
113680	10	7	17	LONG SHORT CUT, THE
113996	0	6	6	BAYOU ROAD
113658	0	9	9	MY LIFE
113959	20	2	22	ROBBER BARONESS
114011	0	3	3	WHAT MY HEART WANTS TO TELL
113899	0	16	16	
113888	0	2	2	DAVID AND DOG
114045	0	21	21	DOUBLE EAGLE
113899	16	6	22	
114017	0	8	8	
114039	10	10	20	CLOSE TO HOME
114017	8	20	28	
113899	22	13	35	
113945	0	10	10	FOURTEEN MINUTES...
113942	11	2	13	OUT OF CONTROL
113996	6	20	26	BAYOU ROAD
114048	3	25	28	WREATH OF ORCHIDS, A
113942	13	8	21	OUT OF CONTROL
114017	28	2	30	
114045	21	10	31	DOUBLE EAGLE
113892	1	10	11	CARTEL
114037	0	10	10	FRIC-FRAC
115457	0	60	60	
115783	0	60	60	
115779	0	60	60	
115780	0	60	60	
109409	104	50	54	ROOTS
113922	0	10	10	DEVIL AND MARY ANN, THE
114036	1	10	11	ENEMIES
113704	2	20	22	JUDITH
113680	17	3	20	LONG SHORT CUT, THE
113672	0	10	10	MORNING IS A LONG TIME COMING
113682	18	10	28	CURIOUS GEORGE GOES TO THE HOSPITAL
113795	21	1	22	INSHORE SQUADRON, THE
113888	2	3	5	DAVID AND DOG
111281	8	1	9	I CAME TO LOVE YOU LATE
110945	13	1	14	GETTING THE MOST OUT OF YOUR FIFTIE
111608	1	1	2	REX STOUT A BIOGRAPHY
111253	0	1	1	SARTON KELL
111179	0	1	1	BOOK OF MERLYN, THE
111275	0	1	1	ART OF BEING BEAUTIFUL AT ANY AGE
111722	15	8	23	MAO'S CHINA
113004	12	18	30	CHARLIE IS MY DARLING
113660	29	2	31	SHAD TREATMENT, THE
113670	15	5	20	OTHER SIDE OF THE SUN, THE
113793	6	6	12	HARRY BY THE SEA
113711	20	11	31	WONDERFUL CRISIS OF MIDDLE AGE, THE
113188	9	20	29	BISHOP AS PAWN
113014	1	5	6	FAMOUS CHARACTERS OF THE WILD WEST
112028	11	20	31	LET'S KILL UNCLE LIONEL

The check-out process begins with the identification of readers due for service, i.e., those that have just returned books. These readers are sorted by date of last service so that those with the longest periods are the first to receive service. Since the system relies on borrower-generated requests, most readers maintain very large numbers of requests on file. At any one time, however, a maximum of 126 requests are available for possible check-out. The remaining overflow requests are stored separately. Periodically, the current and overflow requests are merged, sorted by the last digit of the book number, and the first 126 requests form a current list. As check-out proceeds, a file of inventory change data is accumulated. The data are used to modify the Book File (e.g., to adjust the inventory count) when check-out is completed (see Exhibit 22). Punched cards that identify the reader and the book are enclosed in envelopes and placed in the containers of the appropriate items for mailing.

The processing of returned books (check-in) is accomplished in the following set of steps: punched cards are removed from the containers; these cards are read into the system and the data sorted by reader number; the returned books are removed from the readers' request lists and added to their history lists. If the maximum number of entries that can be accommodated in the History File is exceeded, the overflow items are printed offline, and the hardcopy is filed with other records maintained for each reader. The Book File is then updated to reflect the addition of returned books to the available inventory.

Similarly, to add new requests to the Request File, Library staff code the requests on coding sheets, and the information is keypunched onto cards. During processing, those requests that are valid (i.e., have valid book numbers) are added to the reader's request list. Invalid requests are listed for return to the library staff for correction and resubmission.

Because each transaction is recorded by a staff member on the appropriate coding sheet, it is easy for the Library to support walk-in borrowers. Books checked out to or returned by walk-in readers are processed during the same sequence as those that are circulated by mail.

The Pennsylvania Regional Libraries' System

The system used in both the Philadelphia and Pittsburgh Regional Libraries was developed by a consulting firm with extensive library experience. Each installation of the system utilizes a dedicated PDP 11/35 minicomputer with 96K of memory. Philadelphia operates 10 terminals and Pittsburgh, 9.

The basic data used in this circulation system are divided into these eight files:

(1) The Patron File contains basic information on each borrower, including name and address, demographic data, reading interest profile data, and such service indicators as frequency, media, and quantities desired.

(2) The Request File contains book requests made by or for each borrower. Each request is identified by a book ID number, date of request, and an indicator of the source of the request (borrower or library).

(3) The Now-Has File covers all books currently checked out to each borrower. It includes the book ID number, date sent, copy identification, and a patron (P) or library (L) selection designator.

(4) The Has-Had File lists all titles that each borrower has ever received.

(5) The Bibliography File contains a list of titles for each of the 128 subject codes used to classify books and borrower subject interests. Each list contains the titles that have been assigned a given code.

(6) The Machine File contains data on equipment that allow the library to keep track of the borrower to whom each item has been checked out, the sublending agency, machine status, and the most recent transaction date.

(7) The Magazine File contains data on available magazines to support library distribution and direct distribution by publishers.

(8) The Title (Book) File contains basic bibliographic information about each book in the library collection. Each record also contains subject and inventory information for use in the selection/check-out process.

The Request, Now-Has, and Has-Had Files are designed to contain any number of items, although the library staff can specify a maximum size for each one.

Library staff can add, modify, delete, or display records from any of the files described above. A table summarizing the function commands is given in Exhibit 23 and illustrations of the use of selected commands are shown in Exhibit 24. CRT terminals are used in both libraries, and the system operates in a line-by-line mode for all functions. Each maintenance function has a number of options and built-in safeguards to reduce errors.

In this system, the selection and check-out functions are combined and "selection" means the process of identifying and assigning books to be sent to borrowers. The system allows selection to be performed in one of three modes or in some combination of these modes: Request, Title-ID Input, and Profile. In the Request mode of selection (see Exhibit 25, section labeled A), the system attempts to fill outstanding borrower requests from the Request File by matching each request against the inventory of available books. (The borrower's exclusion criteria and Now-Has and Has-Had lists are checked at the time requests are entered into the system, through use of the REQADD command.) If there are no copies available for a particular item at the time of selection, the Selector may change a request into a reserve on behalf of a borrower.

In Title-ID Input mode (see Exhibit 25, section labeled B), the Selector keys in specific title ID numbers and the system attempts to locate an

available copy of each item. Again, appropriate checks for suitability and non-duplication are made. The Selector is notified of any exceptional conditions, and has the ability to override any selection that is made.

Exhibit 23. Pennsylvania System: Summary of Functions

FILE	FUNCTION				
	DISPLAY	ADD	DELETE	MODIFY	MATCH
Bibliography	BIBDIS	BIBADD	BIBDEL	--	BIBMATCH
Has-Had	HADDIS	HADADD	HADDEL	--	HADMATCH
Machines	MACH	MACH	--	MACH	--
Magazines	MAGDIS	--	--	MAGMOD	--
Now-Has	NOWDIS	NOWADD	NOWDEL	--	--
Patron	PATDIS	PATADD	--	PATMOD	--
Requests	REQDIS	REQADD	REQDEL	--	--
Titles	TTLDIS	TTLADD	--	TTLMOD	--

In Profile mode selection (see Exhibit 25, section labeled C), the system selects books for borrowers on the basis of their reading interest profile. The same checks described above are performed and each selected item is displayed for final approval by the Selector. Subject interest codes on the borrower's profile are processed in a random order to provide the borrower with some measure of variety in the materials he receives.

Any of these modes of selection can be performed for a single borrower (e.g., a walk-in patron) or for a group of borrowers in any terminal session. The Libraries report that, by combining the selection and check-out functions, they did not have to compromise their philosophy that "maintaining

Exhibit 24. Selected Examples of Interactions from the Pennsylvania System

1. Adding a New Title

```
**** ADD TITLE ****


ENTER TITLE ID > RC15321

NEW RECORD BEING CREATED.

TITLE ID (ASCII) > RC15321
# COPIES > 21
# CONTAINERS > 1
# DISC/CASSETTES PER BOOK > 2
AUTHOR > DINESEN, ISAK
TITLE > WINTER'S TALES
PUBLISHER >
PLACE >
DATE >
REISSUE 1 > TB00299
REISSUE 2 > CB00299
REISSUE 3 >
REISSUE 4 >
REISSUE 5 >
REISSUE 6 >
REISSUE 7 >
STATUS > P
SUBJECT 1 > 37
SUBJECT 2 >
SUBJECT 3 >
READER'S NAME > DUNNOCK, MILDRED
VIOLENCE > N
SEX > N
STRONG LANGUAGE > N
LONG > N
SHORT > Y
MALE VOICE > N
FEMALE VOICE > Y
ADULT LEVEL > Y
YOUNG ADULT LEVEL > N
JUVENILE LEVEL > N
ACCENTS > N
GRADE LEVEL > 32
LANGUAGE > EN
RECORDING SPEED > 3
PROFILE SELECTABILITY CODE > Y
LC SUBJECT HEADINGS >
CLASSIFICATION # > FIC
#CIRCULATION YTD INDIVIDUALS >
#CIRCULATION YTD INSTITUTION >
#COPIES ON HAND > 20
# COPIES LOST > 0
# BRAILLE VOLS/COPY > 1
BRAILLE COPY # > 0
# RESERVES > 0

ADD ANOTHER RECORD? > N
```

2. Modifying a Title

```
**** MODIFY TITLE ****


ENTER TITLE ID > TB00299

TITLE : LONE JOURNEY: THE LIFE OF ROGER WILLIAMS.

CORRECT RECORD? > N

ENTER TITLE ID > CB00299

TITLE : WINTER'S TALES.

CORRECT RECORD? > Y

ENTER ITEM # > 11

REISSUE 1 : 00000

**** ENTER NEW ITEM >>>>> > RD\D\C15321

ENTER ITEM # >

MODIFY ANOTHER RECORD? > N
```

Exhibit 24. Selected Examples of Interactions from the Pennsylvania System (Part 2)

3. Displaying "Now Has" Data

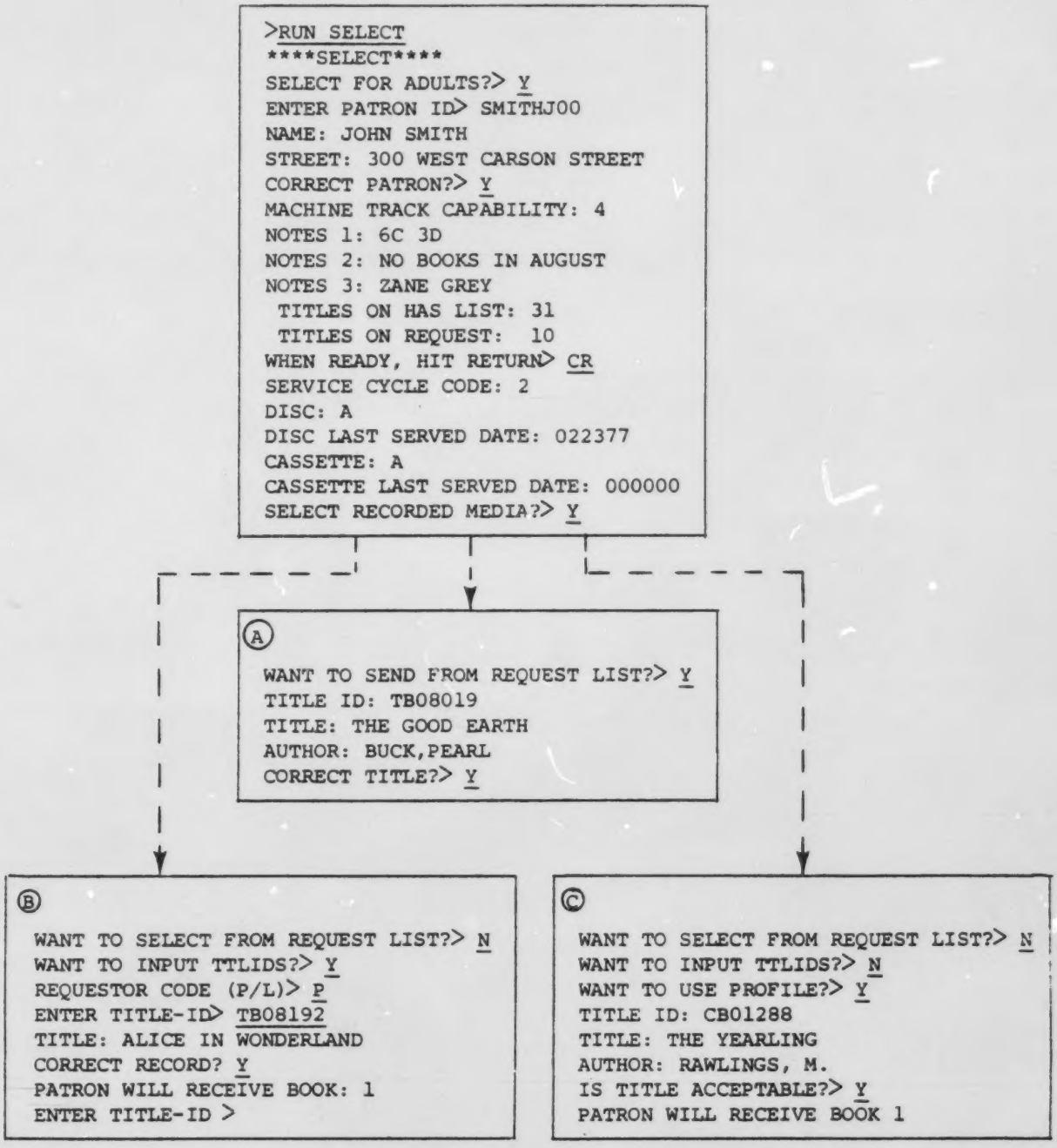
```
**** DISPLAY NOW HAS ****

ENTER PATRON ID > PERDEJ00

NAME   :  *      JOSEPH

STREET :  *  LINDEN AVE

CORRECT RECORD? > Y

DO YOU WANT AUTHOR & TITLE? > Y

TITLE ID : RD08351      011381  P   9
AUTHOR : SMITH, JACK
TITLE : GOD AND MR. GOMEZ


TITLE ID : RD07090      011381  P   13
AUTHOR : LEVENSON SAMUEL
TITLE : IN ONE ERA AND OUT THE OTHER


TITLE ID : RD07262      101480  P   3
AUTHOR : MANN, PEGGY.
TITLE : GOLDA: THE LIFE OF ISRAEL'S PRIME MINISTER.


TITLE ID : RD06467      112280  P   3
AUTHOR : BOMBECK, ERMA.
TITLE : AT WIT'S END.


# TITLES IN THE LIST = : 4

DISPLAY ANOTHER LIST? > N
```

4. Displaying "Has Had" Data

```
**** DISPLAY HAS HAD ****

ENTER PATRON ID > HAENZE00

NAME   : *      ELSIE

STREET :  *  MACASSAR DR

CORRECT RECORD? > Y

DO YOU WANT AUTHOR & TITLE? > N

TITLE ID : RD06798
TITLE ID : RD07370
TITLE ID : RD06623
TITLE ID : RD07362
TITLE ID : RD07147
TITLE ID : RD06937
TITLE ID : RC07387
TITLE ID : RD06651
TITLE ID : RD07344
TITLE ID : RD07387
TITLE ID : RD06383
TITLE ID : TB01714
TITLE ID : TB04066
TITLE ID : RC08707
TITLE ID : RD08707
TITLE ID : RD06785
TITLE ID : RD07105
TITLE ID : RC07150
TITLE ID : RD06467
TITLE ID : RD06348
TITLE ID : TB03504
TITLE ID : TB00003
TITLE ID : RC07295
TITLE ID : TB04268
TITLE ID : RC06610
TITLE ID : RD06610
TITLE ID : RD07295
TITLE ID : RD07989
TITLE ID : RD09037
TITLE ID : RD08452
TITLE ID : RD07544
TITLE ID : RD07150
TITLE ID : RD08154

# TITLES IN THE LIST = : 33

DISPLAY ANOTHER LIST? > N
```

*Indicates that personal identifying information has been removed.

Exhibit 25. Selection Process in the Pennsylvania System



large backfiles of system-generated requests is not public library service." The system does not select items for which there are no copies available and only selects items for which the number of copies on-hand exceeds the number of reserves.

As selection proceeds, a file of names and addresses is created for the subsequent printing of mailing cards. The cards are sorted by Title ID number, to facilitate the retrieval of items from the library shelves. After items are pulled from the shelves, the cards are placed in the card holders on the containers for mailing. When an item is returned, data from the mailing card are used in check-in.

For the check-in function, each item is removed from the borrower's Now-Has list, it is added to the Had-Had list, and the on-hand inventory for the title is increased. The system can also handle the "return" of damaged or lost items by clearing the borrower's record but not increasing the inventory.

PART III. REFERENCE GUIDE TO CIRCULATION SYSTEM REQUIREMENTS

In the following chapters we depart from the more traditional report format to present and discuss a set of circulation system requirements in a form that will be useful for reference purposes. This set of requirements is intended to be used as a departure point for library and data processing personnel to conduct their own system requirements and design studies (and evaluations of available systems). The requirements identified constitute a "master list." Any given library will not necessarily have a need for, or want to incorporate, all of the requirements and, given a particular system design, a number of requirements will not pertain.

In the following three chapters we introduce requirements related to: databases and data elements; system functions; and database-related operations. To facilitate use of these chapters as a reference tool in a requirements analysis, we have provided a checklist in Appendix C that summarizes the complete set of requirements that are identified and discussed in each chapter. The numbering in the following chapters and in Appendix C correspond for easy cross-reference between the narrative and the checklist.

CHAPTER 7.

CONSIDERATIONS FOR DATABASE REQUIREMENTS

In this Chapter, we address a set of requirements for data that must be maintained in a circulation system for any library that serves blind and physically handicapped individuals. These requirements are:

1.0 The system must provide for the development of a database or set of files that contain data on borrowers.

2.0 The system must provide for the development of a database or set of files that contain data on books.

3.0 The system must provide for the development of a database or set of files that contain data on magazines.

4.0 The system must provide for the development of a database or set of files that contain data on equipment.

In any given implementation, Requirements 1.0 and 2.0 are likely to be the most important and, therefore, we focus primarily on those two requirements.

In the sections that follow, we identify and describe a number of data elements that will need to be considered in any database design analysis. Sets of data elements are described for each of the four types of databases identified above. In any given implementation, a "database" may, in fact, be a set of files, each of which contains records that contain a particular subset of data elements, organized around a particular element--a borrower, a book, or a book in any given medium (e.g., braille or disk). Furthermore, data elements that we describe in the context of one database may, in some implementations, be part of another database. For purposes of this presentation, it was necessary for us to describe the elements conceptually in only one database.

In the process of identifying and describing sets of possible data elements to be included in each of the four databases, we also note the major considera-

tions related to: the purpose and use of particular data elements; sizes and formats of fields; alternative definitions of content, i.e., the values of information that are to be accepted in particular data elements; and principles for organizing groups of elements into records. (In the discussions that follow, we use "data element" and "field" interchangeably. We use "file" to mean a collection of records that represent a subset of data elements included in the complete book, borrower, magazine, or equipment databases.)

In the interest of conserving storage space and facilitating certain computer processes, a number of system developers have elected to store information in a highly codified form, e.g., one- or two- character codes that represent the range of valid data for a given field, such as types of borrowers, service modes, or subjects. In considering their requirements, library staff will want to specify requirements or desirable features in several different ways:

- the way in which staff members will key data into the system, e.g., in codified form or fully-spelled out entries, by selecting from an array of choices displayed on a screen, or by indicating Yes or No for each item in a display of valid choices for a given data element.

- the way in which data are to be stored in the system;

- the way in which data are to be displayed at the staff member's terminal.

Different approaches can be supported in a system for each of these areas. For example, the system can store authority files that permit it to expand data that are stored in coded or abbreviated form into fully-spelled-out entries for displays at the terminal. It is also important to note that while data can be organized and stored in formats that facilitate processing by the system, the organization or format may not always be convenient for the library staff. For example, if a particular file contains only a book

number or borrower ID, and only these data are displayed to the library staff, this can be a problem. They may need to see the full book title or the borrower name, which could require the system to draw upon data in several files, to produce the necessary information at display time. Database requirements must encompass service and ease-of-use, as well as internal processing requirements.

1.0 BORROWER DATA ELEMENTS

1.0	The system must provide for the development of a database or set of files that contain data on borrowers.

In this section, we cover elements of data related to each borrower in these sections:

1.1	General Borrower Information
1.2	Service Profile Information
1.3	Request and Reserve Information
1.4	Has-Now (In Circulation) Information
1.5	Has-Had (Previously Circulated) Information
1.6	Magazine Subscription Information

To help provide an overview for this section, we present in Exhibit 26 a complete sample record layout and screen for one system.

1.0 BORROWER DATA ELEMENTS

Exhibit 26. Illustrations of Borrower Data Layouts and Screens

1. Borrower Record Layouts (Wisconsin System)

The Patron Registration File contains:

Borrower Number. (8 characters)

Subregion. (S=Subregional patron, T=Transfer in, R=Reinstated)

Borrower Type. (A=Adult, J=Juvenile, N=Nursing Home, H=Hospital, S=School, L=Library, R=Senior, Y=Young Adult, E=Employee Staff, D=Demo, T=Telephone Pioneer, G=Lending Library, B=Subregional Library, O=Other)

Title. (O=Ms, 1=Miss, 2=Mrs, 3=Mr/Mrs, 4=Mr, 5=Dr, 6=Sr, 7=Rev, 8=Br, 9=Fr)

Borrower Last Name. (13 characters)

Borrower First Name. (10 characters)

Borrower Initial. (1 character)

Extra Address Line. (24 characters)

Street Address Line. (24 characters)

City. (18 characters)

Zip. (5 characters, numeric)

County. (2 characters, numeric)

Area Code. (3 characters)

Local Number. (7 characters)

Extension. (4 characters)

Sex. (F=Female, M=Male, B=Both)

Birth Month. (2 numbers)

1.0 BORROWER DATA ELEMENTS

Exhibit 26. Illustrations of Borrower Data Layouts and Screens (Part 2)

Birth Day. (2 numbers)

Birth Year. (2 numbers)

Local Library. (18 characters; library serving patron)

Library System. (2 characters)

Veteran. (Yes/No)

Hearing Loss. (N=None, M=Moderate, P=Profound, D=Deaf)

Handicap. (V=Visual, P=Physical, B=Both)

Educational Level. (G=Grade School, H=High School, C=College, O=Other)

Job. (100=Professional, Technical, Management; 200=Clerical, Sales; 300=Service; 350=Unemployed; 360=Retired; 400=Farming, Fishing, Forestry; 500=Civil Service; 600=Factory, Labor; 800=Construction; 900=Miscellaneous)

Date of Registration. (in the form MMDDYY)

The Patron Service File contains:

Borrower Number.

Contact Name.

Contact Phone.

Stop/Start Code. (1=Registration address is also mailing address; 2=permanent mailing address; 3=start date code for temporary mailing address; 4=stop date code for temporary mailing address; C=cancel service; E=expired grace period; D=delete borrower record)

Stop/Start Date. (in the form MMDDYY)

Mailing Address Line 1. (24 characters)

Mailing Address Line 2. (24 characters)

1.0 BORROWER DATA ELEMENTS

Exhibit 26. Illustrations of Borrower Data Layouts and Screens (Part 3)

City. (18 characters)

State. (2 characters)

Zip. (5 characters, numeric)

Disc Machine Type. (1=BPH machine; 2=access to machine with 8 rpm; 3=no access to 8 rpm machine)

Disc Service Status. (A=Active; I=Inactive; N=Not until further notification; D=No transaction in 12 months; O=other)

Disc Start Date. (in the form MMDDYY)

Disc Stop Date. (in the form MMDDYY)

Tape Machine Type. (1=BPH machine, 2=access to 15/16 IPS machine, 3=no access to 15/16 IPS machine)

Tape Service Status. (see Disc Service Status)

Tape Start Date. (in the form MMDDYY)

Tape Stop Date. (in the form MMDDYY)

Magazine in Disc Format. (Yes/No)

Magazine in Tape Format. (Yes/No)

Magazine in Braille Format. (Yes/No)

Braille User. (Yes/No)

Native Language. (E=English, G=German, S=Spanish, F=French)

Quantity In-Hand (Tapes). (2 digits)

Quantity In-Hand (Disc). (2 digits)

Quantity Desired (Tapes). (1 character)

Quantity Desired (Disc). (1 character)

1.0 BORROWER DATA ELEMENTS

Exhibit 26. Illustrations of Borrwer Data Layouts and Screens (Part 4)

Service Level. (A=Automatic selection, S=Manual selection, R=Request only, C=Walk-in, W=Item sent weekly, M=Monthly, Q=Quarterly, O=On demand, T=Requests not to be replaced)

Fiction/Non-fiction. (F=Fiction only, N=Non-fiction only, B=Both)

Reading Level. (K=K-3, 4=4-6, 7=7-9, A=Adult, B=Adult will accept juvenile)

Objections. (Yes/No)

Voice. (F=Female only, M=Male only, B=Both)

Reader interest code. (48 occurrences, each 3 digits)

Comment Line. (10 characters)

2. Sample Screen Layout of Borrower Service Data

```
                    WISCONSIN REGIONAL LIBRARY
                FOR THE BLIND AND PHYSICALLY HANDICAPPED
                    SCAN BORROWER SERVICE FILE

ACTION: '___' (SEE BELOW)                  BORROWER NUMBER '_______'
CONTACT NAME    '____________________' CONTACT PHONE '___' '_____' '____'
                 (ALTERNATE MAILING ADDR) STOP/START CODE '_' (1,2,3,4,C,D,E)
ADDRESS LINE ONE '____________________'                    MMDDYY
STREET ADDRESS   '____________________' STOP/START DATE '______'
CITY             '_____________' STATE '__' ZIP '_____'
                                              MMDDYY              MMDDYY
DISC:  MACHINE TYPE '_' STATUS '_' START DATE '______' STOP DATE '______'
TAPE:  MACHINE TYPE '_' STATUS '_' START DATE '______' STOP DATE '______'
              (1,2,3)   (A,I,N,D)     DCB
LANGUAGE     '_' (E,S,F,G) MAG FORMAT '___' (Y,N)   QTY DESIRED DISC '__'
BRAILLE USER '_' (Y,N)                              QTY IN HAND DISC '__'
SERVICE LEVEL '_' (S,L,R,A,C,W,M,Q,O)               QTY DESIRED TAPE '__'
FIC/NONFIC   '_' (F,N,B)                            QTY IN HAND TAPE '__'
READING LEVEL '_' (K,4,7,A,B)
OBJECTIONS   '_' (Y,N)              **ACTION**  **DESCRIPTION**
VOICE        '_' (F,M,B)              NULL      CONTINUE TO READER INTEREST
COMMENTS     '________'               BPH       RETURN TO BPH MAIN MENU
                                      RET       RETURN TO SYSTEM MENU
```

The data elements to be considered in the design and definition of General Borrower Information are identified below.

1.1 GENERAL BORROWER INFORMATION

- 1.1.01 Borrower ID (local)
- 1.1.02 Borrower ID (NLS/BPH)
- 1.1.03 Borrower name
- 1.1.04 Street Address
- 1.1.05 City
- 1.1.06 State
- 1.1.07 ZIP code
- 1.1.08 County
- 1.1.09 Telephone number
- 1.1.10 Alternate street address
- 1.1.11 Alternate city
- 1.1.12 Alternate state
- 1.1.13 Alternate ZIP code
- 1.1.14 Dates for use of alternate address
- 1.1.15 Birthdate
- 1.1.16 Sex of borrower
- 1.1.17 Handicap(s)
- 1.1.18 Borrower type code
- 1.1.19 Status
- 1.1.20 Staff advisor
- 1.1.21 Library that serves borrower
- 1.1.22 Date first served/entered
- 1.1.23 Notes

The elements in the General Borrower Information record are designed to provide background information about each borrower and about the service to be received. This information is used to produce mailing labels; to contact borrowers; and to compile statistics about a library's borrower population. In addition, these data can be used to supply information to NLS/BPH for use in its Comprehensive Mailing List System (CMLS), a computer-readable master file of NLS/BPH network library's borrowers.

In the sections below, we discuss the basic elements of data that can be included in the General Borrower Information record and illustrate variations in the ways that the data are defined and handled in different implementations. Because some libraries will want to supply information in computer-readable form to NLS/BPH, we also highlight a few considerations for developing a format compatible with the CMLS format. However, if a different local format is used, the data can still be converted, either by NLS/BPH or the library, for use in the CMLS system.

1.1.01-.02. Borrower IDs

The Borrower ID is a code that uniquely identifies a particular borrower and is a primary access key (see Chapter 9) for requesting borrower data.

In all systems, there is a provision for a local Borrower ID and, in some, for an NLS/BPH Borrower ID. Local IDs are either assigned by the library staff or generated automatically by the system at the time a borrower record is created. There are at least two types of locally generated IDs:

- Numeric. A numeric character string, of from 5 to 11 digits. These IDs are generally assigned sequentially; however, in some cases, they are derived from some other borrower data, e.g., the individual's social security number.

- Mnemonic. An alphanumeric character string, of from 7 to 8 characters. Mnemonic IDs are generally derived from fragments of the borrower's first and last names. To ensure that these strings are unique, the derivation formula also provides for a final set of digits.

Examples of both types of IDs are provided in Exhibit 27.

Exhibit 27. Examples of Locally Assigned Borrower IDs

System	Type	Example
Alabama	Numeric	01500
Florida	Numeric	276-14-2593
Neoterics	Mnemonic	JONED2 (1)
Pennsylvania	Mnemonic	LEE**J01 (2)
NLS/BPH Comprehensive Mailing List System	Mnemonic	BILLS860FOM0 (3)

(1) This example shows the derived mnemonic for David Jones: the first 4 letters of the last name (JONE), the first letter of the first name (D), and one additional character (i.e., 1-0, or A-Z).

(2) This example shows the derived mnemonic for John Lee: the first 5 letters of the last name, with asterisks to fill in blanks for names with fewer than 5 letters (LEE**); the first letter of the first name (J), and two additional digits (01).

(3) This example shows the derived mnemonic from data on Marion Bills.

1.1.03. Borrower Name

The borrower name is used in the production of mailing labels and is included in displays of borrower data. Although names are stored in all of the systems, they are not stored in a single, standard format. The types of approaches taken are as follows:

- Fixed-length sub-fields, for the last name, first name, and middle initial or name.

- A single field, either fixed- or variable-length, for the full name, presented in inverted form (LASTNAME FIRSTNAME INITIAL)

- A single field, with delimiters (e.g., a semicolon or comma) to distinguish parts of name, entered in a specific order, e.g., JOHNSON, THOMAS CHRISTOPHER

In establishing a name format, the library staff should anticipate their needs for various kinds of sorted listings and consideration should be given to the format used by NLS/BPH in CMLS, which distinguishes last, first, middle names, prefixes (e.g., Dr. or Reverend), and suffixes (e.g., Jr., III). In most implementations, a maximum field length is established for either the full name or for each part of the name. As a result, some names are truncated.

1.1.04-.07. Address

Each borrower's address, which is used in the production of mailing labels, includes the street address, city, state, and ZIP code. In most systems, components of the address are stored in individual fields. The field lengths allocated for the address components vary in implementation, as indicated below.

Street address:	30 to 80 characters; for CMLS, 90 characters.
City:	15 to 25 characters; for CMLS, 19 characters.
State:	2 to 16 characters; for CMLS, 2 characters.
ZIP code:	5 to 9 characters; for CMLS, 9 characters.

The placement of the ZIP code in a separate field is particularly important so that it can be used in the sorting of mailing labels. In some of the Libraries, plans are being made to expand this field to accommodate the 9-digit ZIP code, if it is approved in the near future.

1.1.08. County

The county of residence is used primarily in the compilation of borrower statistics and in the sorting of mailing labels. In one library, the data are used for staff assignments: all borrowers in one county are served by a single library staff member. This data element is handled in over half of the systems and is generally represented by a 2-digit code.

1.1.09. Telephone Number

Because library staff may need to contact their borrowers, telephone numbers are included in some systems. The field lengths among systems vary from 6 to 14 digits. In the Wisconsin system, provision is also made to maintain a name and telephone number for a person whom the library staff can contact regarding a borrower who is unable to communicate via telephone.

1.1.10-13. Alternate Address

The alternate address represents a location at which a borrower is to receive service for some specified period of time. This set of fields is provided for in only four of the systems. An alternative approach taken in two other systems uses a field to indicate whether the currently stored address is the borrower's permanent or temporary address. In the Wisconsin system, a distinction is made between a residence and a mailing address.

1.1.14. Date for Use of Alternate Address

This data element includes the date on which service to the borrower's alternate address is to begin and, as well, the date on which it is to terminate. In three systems--Alabama, Michigan, and Cincinnati--these data are used to switch a borrower's service automatically. Dates in this field are generally formatted as MMDDYY, or MMDD, or MMYY.

1.1.15. Birthdate

These data are used in the compilation of statistics and, by some, in the selection of books by staff members. The most frequently used formats for birthdates are in some form of M (for month values), D (for day values), and Y (for year values), e.g., MMDDYY, YYY, MMYYYY, and MMDDYYYY. The YYY format is used in the NLS/BPH Comprehensive Mailing List system.

1.1.16. Sex of Borrower

In the majority of systems that provide for this data element, the field is designed as a one-character code, presenting such alternative identifiers as Male; Female; Couple; and Data Not Available.

1.1.17. Handicap(s)

All systems provide for the storage of data on a borrower's handicaps. Among the alternative coding schemes used for this field are:

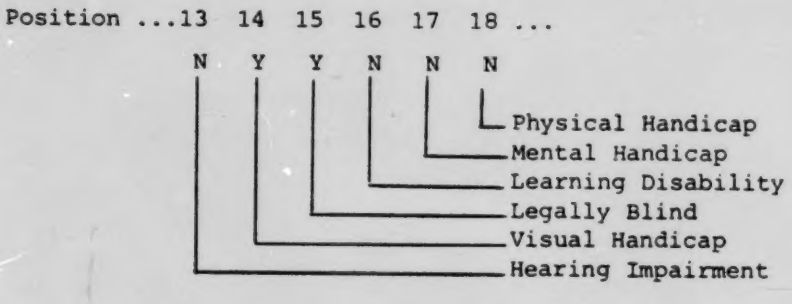
The Colorado System

B - Blind
P - Physically Handicapped
V - Visually Handicapped
R - Reading (Learning Disability)
M - Multiply Handicapped

The Massachusetts System

P - Physically Handicapped
V - Visually Handicapped
B - Both

The DRA system, as well as a few others, designate a fixed set of positions (or fields) in the record for each of several handicaps, and a Yes/No indicator is used in each of the positions (or fields). For example, in the DRA system:



In the Florida system, the borrower's primary handicap is stored as a single alphabetic code but is displayed in a spelled out form.

1.1.18 Borrower Type Code

A set of codes is typically used to characterize institutional borrowers and, in the same or a separate field, the age group of individual borrowers.

Institutional Borrower Type Codes. For statistical purposes, institutional borrowers are classified in one of several categories, including the following: hospitals; nursing homes; schools for the blind or handicapped; public or private elementary and secondary schools; libraries (not subregional); others. Although the number of categories varies from 5 to 8 among the systems, the most typical format among all is the use of a single-character code.

In the Colorado, Cincinnati, and DRA systems, provision is also made to distinguish between institutional borrowers that circulate books (i.e., maintain deposit collections) and those that do not circulate books (i.e., that maintain demonstration collections). In the Colorado system this indicator is carried as one of the institutional codes; in the DRA and Cincinnati systems, the codes are carried in another field.

Individual Borrower Type Codes. In the same or in a separate field from the institutional code, a code is used to indicate whether the borrower is an adult or a juvenile. In a few systems, e.g., Pennsylvania, a code is also available to identify Veterans, for use in establishing priorities in equipment loans.

1.1.19. Status

At a minimum, the status indicator establishes whether the borrower is: Active (receiving regular service); Inactive (service has been terminated); or Suspended (service is on hold). Although additional categories may be needed, these three are among the most commonly used. In most systems, the status code is stored in a one-character field.

Additional consideration in designing this field needs to be given to the accommodation of status information for each medium that is acceptable to the borrower. For example, service on disks could be Inactive, while service on cassettes could remain Active.

1.1.20. Staff Advisor

In at least one system, the name of the library staff member to whom the borrower is assigned for service is recorded. However, most libraries make such assignments by an easy-to-remember method, e.g., alphabetically by the borrower's last name, and staff members feel that storage of this information is not necessary.

1.1.21. Library That Serves Borrower

Borrowers in some states receive book service from a subregional or local library. In many of these cases, however, the Regional Library maintains data on all borrowers, throughout the state, for statistical purposes, to provide backup services, and/or to circulate specific types of materials,

e.g., braille, magazines, and/or equipment. Therefore, the need for this field is dependent on the way in which responsibilities are distributed among the NLS/BPH libraries in a given state. In most systems that handle this data element, the subregional libraries are represented by codes.

1.1.22. Date First Served/Entered

The date on which a borrower was registered for service or, alternatively, the date on which materials were first sent to the borrower, is recorded in most systems. The most typical format is MMDDYY. In some systems, this data element is recorded for each medium acceptable to the borrower.

1.1.23. Notes

To help library staff maintain personalized service, a number of systems provide a free-form field in which notes about borrowers or their services can be entered. The space allocated for this field varies per system from about 24 to 319 characters. In the Massachusetts system, a one-character "note indicator" is provided to alert the staff to the existence of additional borrower information in a manually maintained file. Plans are being made to change this to a 20-character field, to carry the information in the file.

The data elements to be considered in the design and definition of Service Profile Information are identified below.

1.2 SERVICE PROFILE INFORMATION

- 1.2.01 Language(s)
- 1.2.02 Reading level/grade level
- 1.2.03 Subject interests
- 1.2.04 Exclusion criteria
- 1.2.05 Media
- 1.2.06 Maximum number of books allowed
- 1.2.07 Minimum number of requests needed to maintain level of service
- 1.2.08 Service type
- 1.2.09 Circulation quantities
- 1.2.10 Request-only service
- 1.2.11 Automatic selection acceptance
- 1.2.12 Date of last service
- 1.2.13 Number of items received

The elements of the Service Profile record are designed to provide data on how many and what types of books a borrower wants to receive, as well as on when the borrower wants to receive them. The Service Profile data are used in several circulation functions, including selection, check-out, and check-in.

The borrower database in all systems contains some amount of service profile information. However, the elements and level of detail in these elements vary considerably, in large part because of differences in the ways that they are used, particularly for staff and/or system selection. Differences also occur among the systems with regard to the handling of the service profile information at a borrower level or at a per-medium level for each medium acceptable to a borrower. In such systems as Neoterics and DRA, many of the elements described in the following sections

are specified on a per-medium basis. In some other systems, e.g., Colorado and Albany, only some of the data elements are specified on a per-medium basis. The first set of data elements described in the following sections, from 1.2.01 through 1.2.07, is most likely to be handled at the borrower level, whereas the final set, from 1.2.08 through 1.2.13, is likely to be handled on a per-medium basis.

1.2.01. Language(s)

Preferences for language or languages of books that a borrower wants to receive can be used in staff and/or automatic selection. For example, in the DRA system, a set of one-character mnemonic codes is used to represent languages: E, for English; F, French; G, German; H, Hebrew; I, Italian; S, Spanish; Y, Yiddish. Among the various systems, up to eight languages are provided for, including, in one or more systems, Polish, Russian, and Chinese. In automatic selection, language is frequently used as one of the matching criteria.

1.2.02. Reading/Grade Level

This element is used to indicate the level of reading difficulty that is appropriate for the borrower. It is used primarily for juvenile borrowers and, in many systems, is based on educational levels. Examples of several reading/grade level classifications are presented in Exhibit 28. In most systems, these levels are represented as one- or two-character codes, in their own field, or as Yes/No flags in a fixed set of fields or positions. In the two systems that do not handle this data element, the Libraries are providing only minimal book selection service for borrowers.

Exhibit 28. Samples of Reading/Grade Level Classifications

Cincinnati Reading Level Categories	Neoterics Educational Level Categories
Kindergarten - 3rd	Unknown
4th - 8th	Special education
Adult	No formal education
	1 year grammar school
	2 years grammar school
DRA Grade Level Categories	3 years grammar school
	4 years grammar school
	5 years grammar school
Preschool - 2nd	6 years grammar school
Kindergarten - 3rd	7 years grammar school
2nd - 4th	8 years grammar school
3rd - 5th	1 year high school
4th - 7th	2 years high school
5th - 8th	3 years high school
6th - 9th	4 years high school
Junior and senior high school	1 year college
	2 years college
	3 years college
	4 years college
	Post graduate study

1.2.03. Subject Interests

Subject classifications are the primary means by which selection is made for borrowers by the library staff and/or the system. There is considerable variety among the subject classifications that are used, as illustrated in Exhibit 29.

Exhibit 29. Illustrative Subject Categories

Cincinnati Subject Categories (hierarchical classification scheme)	Pennsylvania Subject Categories
010 Adventure (fiction)	Adult = 001-086
011 Animal stories	Juvenile = 087-127
012 Classical (romance)	
013 Flight (aviation)	001 Adventure
014 Man and nature	002 Animal stories
015 Sea	003 Art
016 .	004 Best sellers
017 .	005 Biography
018 .	006 Black literature
019 Other	007 Business
***	008 Careers and vocations
	009 Classics
060 Classics (fiction)	010 Current Affairs
061 Pre-20th century	011 Entertainers
062 20th century	012 Family stories
063 Russian	013 Gothic novels
064 (Newberry) Award winners	014 Handicaps
065 .	015 Health
066 .	016 Historical novels
067 .	017 History
068 .	018 Homemaking
069 Other	019 How-to books
	020 Humor

The data are generally stored in the form of codes, but there is considerable variety in the way that they are used in automatic selection, to match preferences and to achieve variety in the selection of items to be circulated at one time.

The storage format is generally one of these two types:

(1) Codes are entered in a specified number of subject interest subfields (which range in number from 4 to 48, per borrower)

Subject Interest 1: 012 is entered
Subject Interest 2: 420 is entered

(etc.)

(2) Yes/No flags are set in a fixed set of subject interest positions or subfields:

Subject Category 001: Y is entered
Subject Category 002: N is entered

(etc.)

In one system that does not provide automatic selection, the subject interests of borrowers are stored in a 69-character free-form field, which is reviewed by staff members during staff selection.

To achieve weighting or some variety in selecting a set of titles, e.g., to provide more mysteries than historical novels, several different approaches are used. For example, in the DRA system, a major or preferred interest area is represented in the list of codes more than one time, e.g., the code for mysteries is repeated several times, so that, after the system has processed all subject interest codes for selection, the selected items represent the numbers of repeated codes, e.g., more mysteries will have been selected. In the Pennsylvania system, a borrower's subject categories are processed in random order to ensure variety in the books selected for the borrower. To support staff selection in some systems, additional information on borrower interests is stored in the Notes field of the borrower database.

1.2.04. Exclusion Criteria

A special set of general content codes are represented in a field (or fields) of exclusion criteria--characteristics of books that are used to identify titles the borrower does not want to receive. Among the criteria used in one or more systems are: sex; violence; rough language; length of book (e.g., long or short); narrator (male or female); and narrator characteristics (e.g., foreign accent).

The most common ways in which these criteria are stored is in the form of Yes/No flags in a fixed set of positions. The number of exclusion criteria used among the systems ranges from 1 to 11.

1.2.05. Media

The standard book media included among the BPH library collections are disk, cassette, and braille; in addition, some also handle large-print books and/or reel-to-reel tapes. However, because all borrowers cannot

accept all media (e.g., because of their particular handicap or because of the equipment they have available), the designation of acceptable media per borrower is an important requirement.

Although a number of systems store media data through Yes/No flags in a series of fixed positions designated for each medium, other approaches are also used. For example, in the Alabama system, a set of two-character subfields is used, each of which represents one of the four media that Alabama circulates. A number in a given subfield (e.g., cassettes) identifies the initial quantity of books to be sent in that medium. This approach combines media and quantity data. In the Pennsylvania and DRA systems, status and activity data are carried in each medium field. For each medium, an indication of the borrower's service or status in that medium is provided: active; inactive; on hold; not wanted until requested; has never received before; deceased; hold; transferred; or removed.

In the Cincinnati system, a one-character field is used for storing one of the following codes, representing permutations of all possible options: 1 (disks); 2 (cassettes); 3 (disks and cassettes); 4 (braille); 5 (braille and disks); 6 (braille and cassettes); 7 (braille, disks, and cassettes), etc.

1.2.06. Maximum Number of Books Allowed

An administrative limit is generally set to establish a ceiling on the number of books that can be checked out to a borrower at one time. These limits are sometimes established to conserve storage. Unless a fixed amount of storage is actually allocated for various files, the systems generally permit a library staff member to override the limit on a discretionary basis. In a few systems, the maximum number of books is specified for each medium in which the borrower receives service. Most of the limits on the number of books permitted in circulation for a borrower are under 100.

1.2.07. Minimum Number of Requests Needed to Maintain Level of Service

Unless automatic selection is triggered as part of automatic check-out, it is necessary to devise some means for maintaining requests (in the Request file) at certain minimum levels, to help ensure that the desired quantities of books for which copies are available can be identified at check-out. There are several methods that can be used. In a few systems, e.g., in Pennsylvania and DRA, a field is provided to indicate the minimum number of books that are needed to maintain that borrower's expected service (quantity) levels. This number is generally computed on the basis of the number of books that the borrower is to receive and the frequency of service. In Illinois, the minimum number of requests is generally computed to be twice the maximum number of books a borrower can receive.

1.2.08. Service Type

The basic set of options for the frequency with which a borrower is to be processed in book check-out includes: Calendar, Turn-Around, and Will-Call. (See Part II for a discussion of these service types.)

Although this field is not required unless multiple service types are accommodated, provision to handle more than one service frequency is built into a few systems, for possible use at some later time. Among the Service Type codes used are those listed in Exhibit 30.

Exhibit 30. Sample Sets of Service Type Codes

Neoterics	DRA
D = Demand (will-call)	RE = As returned (turn-around)
R = Rotational (turn-around)	WK = Weekly
W = Weekly	BW = Every two weeks
B = Biweekly*	TW = Every three weeks
	MO = Monthly
	RQ = Only when requested (will-call)
	DM = Direct mail magazines only
	SP = Special**

*The New Jersey Regional Library has nine different groups of borrowers served biweekly. A borrower is assigned to group B1, B2, B3, etc.

**Any special service instructions are described in the NOTES field.

1.2.09. Circulation Quantities

This data element is used to indicate how many books are to be sent automatically to a borrower at check-out, e.g., five cassette books every three weeks.

Although libraries that accommodate only Turn-Around and/or Will-Call borrowers do not include this data element in their systems, others, e.g., Alabama and Michigan, record the number of books that were sent initially to borrowers.

1.2.10-.11. Request-Only Service and Automatic Selection Acceptance

These two fields are used to identify borrowers who want to receive only the books that they request or those who will accept staff or system selections. In general, Yes/No flags indicate the presence of one or both of these conditions of service, although, in some systems, only one of the two conditions is accommodated.

1.2.12. Date of Last Service

This data element is used by library staff to monitor the status of each borrower, e.g., whether the borrower is "active" or has not received or requested service for a particular period of time. In at least 10 of the systems, the date of last service to a borrower is maintained, and in six of these, a date is recorded for each medium. The dates generally conform to the standard format established for a particular system, e.g., MMDDYY.

1.2.13. Number of Items Received

To support various types of statistical analyses on circulation, a number of systems provide for one or more fields of cumulative circulation statistics, per borrower. Illustrations of the statistics that are tallied and stored in several systems are given below:

Alabama:	Current six months and previous six months
DRA:	Month-to-date and year-to-date
Florida:	Month-to-date
Massachusetts:	Current six months and cumulative total
Pennsylvania:	Year-to-date

In the Alabama system, both the numbers of book titles and the numbers of containers (or volumes) are tallied and stored. In some systems, the number of magazine containers or volumes is stored separately from the statistics on book circulation.

The data elements to be considered in the design and definition of Request and Reserve Information are identified below:

1.3 REQUEST AND RESERVE INFORMATION	
1.3.01	Number or ID of item (book, magazine, equipment) requested
1.3.02	Date of request
1.3.03	Source of request (for books)
1.3.04	Number of items requested
1.3.05	Book number of title reserved
1.3.06	Date of reserve
1.3.07	Number of items reserved

Requests are items (books, magazine issues, equipment) that a borrower has asked to receive or that have been selected for a borrower by the library staff or by the system. Three types of requests can be distinguished on the basis of their origin:

1. Borrower-generated requests: Items selected by a borrower
2. Staff-generated requests: Items selected for a borrower by library staff
3. System-generated requests: Items selected for a borrower by the system, automatically.

The term "requests" without a source qualifier (e.g., borrower-generated or staff-generated) is used here to refer to requests from any or all of these sources.

Borrowers can typically submit requests for books, magazine issues, or equipment. Because the need for handling requests for magazines or equipment is not as great, for most libraries, as the need to handle requests for books, this section focuses on the latter. Where appropriate, information specifically relating to magazine or equipment requests is provided.

Request data are stored for two main purposes:

- to keep track of which items a borrower has asked to receive
- to support automatic check-out from a set of pre-selected and pre-screened materials from which items can be sent as copies are available

In almost all of the fully operational systems, data on requests are stored in a "Request File" that is physically and logically separate from General Borrower and Service Profile Information. This approach is taken because General Borrower and Service Profile Information are more easily stored in fixed-length records, whereas borrowers' request lists are typically of variable length, and because the request lists are subject to frequent additions and deletions.

In six of the systems, provisions are made for storing and processing high-priority borrower-generated requests, generally known as "reserves." (In two other systems, this capability is being planned.) This capability is not provided in all systems because the philosophy of service in some libraries is that books should always be sent to borrowers on a first-come, first-served basis. However, in other libraries, the argument is made that, for a variety of reasons--school, work, research, or therapy--an individual may need to receive a book as soon as a copy is available.

Before discussing the individual elements of Request and Reserve Information, three considerations related to the storage of these elements need to be mentioned for context:

- Requests can be stored in the borrower database, as a list of titles selected by or for a particular borrower, or they can be stored in the book database, as a list of borrowers for or by whom a particular title has been selected.

- The order in which titles are stored on the request list can affect the order in which they are processed during the check-out function.
- Request lists for books and magazines are stored together in some systems, while in others they are stored separately. An equipment request list that is accommodated in one system is also stored separately.

1.3.01 and 1.3.05. Number or ID of Item Requested/Reserved

For reasons of compactness and convenience of access, a book number (magazine issue number or equipment model number) is used in most systems to record a request or a reserve. For purposes of display, however, the library staff may require that the system also retrieve the book or magazine title associated with that stored number.

1.3.02 and 1.3.06. Date of Request/Reserve

The date on which a request or a reserve is entered into the system is used in several ways, including the following:

- to establish a processing order at check-out;
- to identify the oldest requests on a borrower's request list if periodic purging will be required;
- to assist in the identification of requests that have not been filled for some period of time.

The presence of large numbers of old, unfilled requests--determined through periodic review by staff or, preferably, the generation of periodic reports by the system--can indicate a potential problem in the system's circulation procedures or, possibly, the need to produce a greater number of copies for certain titles.

Dates in this field generally conform to the formats used in a particular system, although in some systems an inverted date format--YYMMDD--is used to facilitate sorting.

1.3.03. Source of Request (for books)

As described earlier, book requests can originate from three sources: the borrower, library staff, or system. Systems that provide for requests from all three sources also provide some means for distinguishing among them. The methods in use to make this distinction include:

- A field with codes to indicate the source of the request. For example, in the Colorado system, a one-character code (e.g., A = borrower-generated request) is carried in each request record to indicate the source.
- The creation of separate files for requests of different origins. For example, in the Michigan system, one file is maintained for requests made by borrowers and another for those made by staff.
- Special sorting of a single request file. For example, the Neoterics system sorts borrower-generated requests so that they are carried first in the request file, and they are processed in check-out before requests from other sources.

1.3.04 and 1.3.07. Number of Items Requested/Reserved

The number of items requested or reserved is used by library management to determine the number of requests or reserves currently in the system or to monitor the volume of requests and reserves over a period of time.

In several systems, the first purpose is met through the storage of the number of requests that a borrower has on file. In a subset of these systems, the numbers are maintained by medium. The second purpose is met in a fewer number of systems through the computation of requests or

reserves over a period of time, e.g., month to date and year to date. Distinctions are made in some of the systems to provide totals for requests of different origins. Exhibit 31 shows how these two different statistics are handled in two systems.

Exhibit 31. Sample Methods of Storing the Number of Requests and/or Reserves

Michigan: Current Number of Requests	Massachusetts: Number of Requests Over a Period of Time*
Unfilled Personal Requests:	Reserves: XXX/YYY
Disk: ☐ ☐ ☐ ☐	Requests: XXX/YYY
Cassette: ☐ ☐ ☐ ☐	Substitutions: XXX/YYY
Unfilled Library Selections:	
Disk: ☐ ☐	
Cassette: ☐ ☐	

*Requests/Reserves = Borrower-generated requests
Substitutions = System-generated requests
XXX = Total for all preceding periods
YYY = Total for current six-month period

The data elements to be considered in the design and definition of Has-Now (in-circulation) Information are identified below:

1.4 HAS-NOW (IN-CIRCULATION) INFORMATION	
1.4.01	Number or ID of item (book, magazine issue, equipment unit) checked out
1.4.02	Date of check-out
1.4.03	Indicator for possession of equipment accessory type

Items that are currently in a borrower's possession are stored in a record, generally by borrower, in a Has-Now file. This file is generated during the process of check-out and is used to track the disposition of library materials and to eliminate the possibility of selecting duplicate items. These records can also be used in the determination of the number of books a borrower (e.g., on Calendar Service) is to receive, on the basis of the number that are checked out.

Although a number of different file organizations of records are used in the various systems, e.g. by item or by borrower, the key elements of information that are recorded in the files are the borrower ID and item number, and the date of check-out. (Separate files are generally maintained of Has-Now information on magazines and equipment.) In the Colorado system, Has-Had (see next section) data are also maintained in the same file, with the distinction between a Has-Now and Has-Had item being made with a one-character code. In the Neoterics system, each Has-Now record carries an indicator of whether a title is checked-out or is on reserve. In both cases, these implementations have been designed to minimize redundant storage, maintenance, and/or processing time.

1.4.01. Number or ID of Item Checked Out

A unique identifier is recorded for each item that is checked out. This number is the book number (or, in some systems, the book copy number), the magazine ID and issue (or, in some systems, the magazine issue copy number) or the equipment unit number.

1.4.02. Date of Check-Out

This date is used by staff to answer inquiries from borrowers regarding materials that may have been mailed by the library but have not been received and to identify books that a borrower has held past the maximum period. Although circulation limits have not been established in all libraries, a few of the systems do provide for the generation of overdue notices on books that have been checked out for more than three months.

Dates in this field generally conform to formats established in a particular system, although an inverted date format--YYMMDD--is used in some of them to facilitate date sorting.

1.4.03. Indicator for Possession of Equipment Accessory Type

Unique numbers are generally not assigned to machine accessories. Therefore, in one system, the Has-Now information recorded for accessories indicates the type of accessory that is in the borrower's possession. In another system, a Yes/No flag is used to indicate possession of one or more accessories: headphones; pillow speakers; remote control unit; speed control unit; tone arms; needles; ear plugs; or straps.

The data elements to be considered in the design and definition of Has-Had (previously circulated) Information are identified below:

1.5 HAS-HAD (PREVIOUSLY-CIRCULATED) INFORMATION

- 1.5.01 Book number of item previously checked out
- 1.5.02 Date of check-out
- 1.5.03 Date of check-in
- 1.5.04 Number of days in borrower's possession
- 1.5.05 Book number below which books are not selected for borrower

Books that have previously been checked out to a borrower are maintained in records, organized by borrower, in a Has-Had file. The primary use of this information is to prevent items from being selected and checked out a second time to the same borrower.

Opinions on the need for an entire Has-Had history record differ among the various libraries. In some implementations, Has-Had information is maintained over the entire reading history of a borrower. In others, a cut-off point is established, because staff believe that storage costs for maintaining history files of thousands of titles cannot be justified. A cut-off point is based in some cases on a maximum number of titles (e.g., 150 or 1200) that can be accommodated with the available storage and in other cases on the basis of time (about two years in one system and five years in another).

One compromise solution is to maintain back histories on magnetic tape or microfilm. In a few libraries that have established maximum numbers of Has-Had records to be stored, principles for selection have been established to help prevent duplicate selections. For example, in one system, disk or

cassette titles with book numbers lower than a particular number are not included among selections, on the assumption that numbers below this cut-off point correlate fairly well with the range of book numbers likely to have been checked out in some earlier assignment. This approach also assumes that the newer books (i.e., those with higher book numbers) are more likely to be wanted by the borrower.

Another consideration that contributes to differences among the systems is the point in time at which the Has-Had data are generated. In some systems these data are generated at check-out; in others they are generated at check-in.

1.5.01. Book Number of Item Previously Checked Out

The book number (or book copy number) is the primary identifier used in the Has-Had records. Some systems also store the book number(s) of the same title in different media and/or of re-issues of the title in the same medium in the Has-Had file to avoid the duplication of sending a book in one version or medium when the borrower has already received it in another.

1.5.02 and 1.5.03. Date of Check-out/Check-in

This information is used to identify titles to be purged from the borrower's Has-Had record, in cases where there is a maximum to the record size that can be maintained. For management purposes, these dates can also be used to compute the time each item is in circulation. Dates in this field generally conform to the formats established in a particular system, although inverted date format--YYMMDD--is sometimes used to facilitate date sorting.

1.5.04. Number of Days in Borrower's Possession

In the Alabama system, this information is stored in a three-digit field, to monitor the average number of days that borrowers keep books.

1.5.05. Book Number Below Which Titles Are Not Selected For Borrower

In the two systems--Neoterics and Pennsylvania--that provide for the storage of the book numbers below which titles are not to be selected for a borrower, this number is specified for each medium.

The data elements to be considered in the design and definition of Magazine Subscription Information are identified below.

1.6 MAGAZINE SUBSCRIPTION INFORMATION

- 1.6.01 Magazine ID
- 1.6.02 Issue first received by borrower
- 1.6.03 Date subscription began
- 1.6.04 Priority indicator

Magazine Subscription Information is used to assist in the circulation and/or distribution of magazines mailed by the library to subscribers and/or to provide system-generated reports on borrower subscription data, for use in the NLS/BPH Comprehensive Mailing List System.

Of the 13 systems that were studied, six provide for Magazine Subscription Information. In three of these, borrower subscription data are stored separately from the general borrower information. The major elements of information used in this area are identified and described briefly below.

1.6.01. Magazine ID

A unique magazine title identifier is assigned to each magazine in each medium.

1.6.02 and 1.6.03. Issue First Received by Borrower and Date Subscription Began

In two systems, these data elements are used to provide historical information on borrower subscriptions. The Issue First Received serves to indicate with which issue (not necessarily the current issue) a new subscription is to begin. Dates in the Date Subscription Began field conform to the date formats used in a particular system.

1.6.04. Priority Indicator

In some Libraries, circulation priorities are assigned to subscribers (by the Library staff or by the system) for magazines that are circulated. Some of the procedures used for this prioritizing are summarized below.

DRA System. Each subscriber to a given magazine is assigned a number from 0 to 255. Copies of magazine issues are checked out in numeric order to the subscribers who are due to receive them.

Neoterics System. Each subscriber to a magazine is assigned one of three 1-digit priority codes: 1, 2, or 3. A "1" represents the highest priority.

2.0 BOOK DATA ELEMENTS

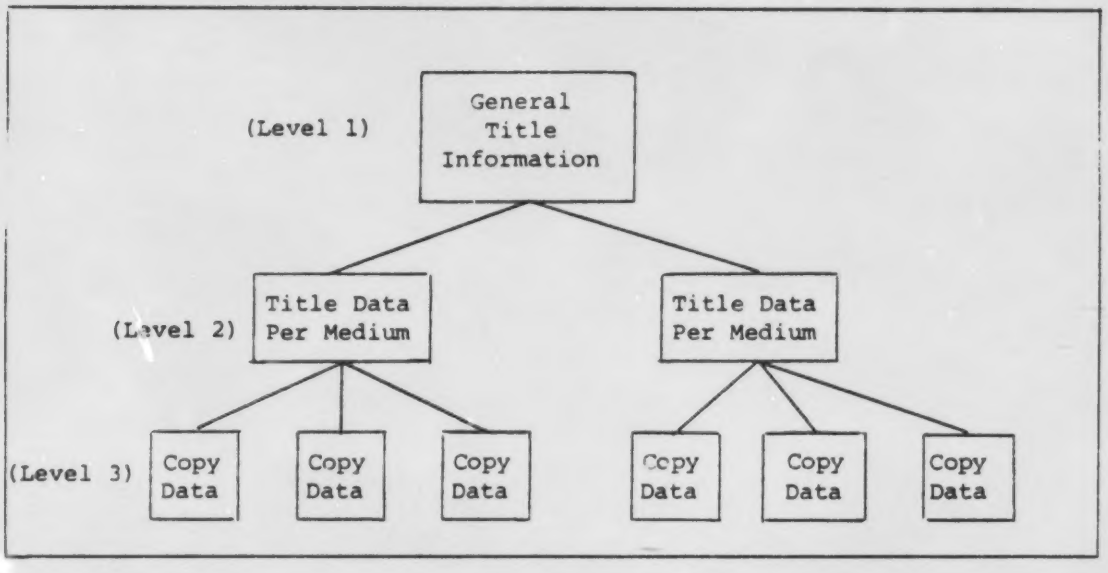
2.0 The system must provide for the development of a database or set of files that contain information on each book.

Information on a given book is covered by a set of over 40 possible data elements that we have grouped into three levels:

2.1 General Title Information
2.2 Title Data Per Medium
2.3 Per-Copy Data

These levels represent a conceptual model for analyzing data elements within the book database, and are hierarchically related as illustrated in Exhibit 32.

Exhibit 32. Hierarchical Relationship Between Groups of Data Elements in the Book Database



2.0 BOOK DATA ELEMENTS

This conceptual representation does not necessarily reflect the implementation of any particular system. It is presented to help describe relationships among the groups of data elements. To provide an overview of the elements covered in this section, we present in Exhibit 33 a book record layout and screen display from one system.

2.0 BOOK DATA ELEMENTS

Exhibit 33. Book Data in the Alabama System

1. Book Record Layout

Data Element	Length (# of characters)	Coding/Description
Book Number	7	
Subject Code	3	4 occurrences
Author	15	
Title	35	
Fiction	1	Yes/No
Double Vision	1	Yes/No
Volumes	2	Number of volumes per copy
Owned	3	Number of copies owned
In-house	3	Number of copies in-house (available for check-out)
Recording Speed	10	
Language	1	
Reading Level K-3	1	Yes/No
Reading Level 4-6	1	Yes/No
Reading Level 7-9	1	Yes/No
Reading Level YA	1	Yes/No
Voice	1	
X-rated	1	Yes/No (contains/does not contain)
Extra	1	Number of extra titles in container
Manual Circulation	1	
Other Book Number	7	Book number of re-issue
Other Media Number	7	Book number of same titles in another medium, up to 3 occurrences
Date Last Sent	6	in form MMDDYY
Number of times circulated this 6 months	4	

Exhibit 33. Book Data in the Alabama System (Part 2)

1. Book Record Layout (con't.)

Data Elements	Length (# of characters)	Coding/Description
Number of times circulated last 6 months	4	
Number of pending personal requests	4	
Number of pending library requests	4	
Annotation	40	

2. Sample Screen Display for One Title

```
FC-801  BOOK NO-1-005025
 SUBJECT BREAKDOWN -  1ST-010  2ND-020  3RD-___  4TH-___
 AUTHOR-MITCHELL,MARGA  TITLE-GONE WITH THE WIND_____________
 ANNOTATION-_____________________________ FICTION-1  2-VIS-_
 VOLUMES-01  OWNED-016  IN-HOUSE-013  SPEED-8_________ LANGUAGE-E
 3-___  4-___  7-___  TA-___
 VOICE-N    C-RATED-_    EXTRA-_    MANUAL-_
 OTH BOOK NO-01-000500
 OTH MEDIA NO-2-005025    OTH MEDIA NO-_-______    OTH MEDIA NO-_-______
         DATE LAST SENT-10-02-80       TIMES SENT THIS 6 MO-0001
         UNFILLED PERSONAL SEL-0001    UNFILLED LIB SEL-0000
```

The data elements to be considered in the design and definition of General Title Information are identified below:

2.1 GENERAL TITLE INFORMATION	
2.1.01	Title
2.1.02	Title search key
2.1.03	Non-filing indicator
2.1.04	Author
2.1.05	Author name search key
2.1.06	Publisher
2.1.07	City (city and state) of publication
2.1.08	Year of publication
2.1.09	Edition
2.1.10	Reading/Grade level
2.1.11	Exclusion indicators (not narrator-related)
2.1.12	Subject codes
2.1.13	Subject heading(s)
2.1.14	Classification number
2.1.15	Automatic selection allowed
2.1.16	Series information
2.1.17	Notes/annotation

Elements of data that are grouped into a General Title Information record are the same for all versions of a book, regardless of the medium in which they are produced. These data are used primarily in the selection of books for borrowers and for the compilation of bibliographies by subject, author, or other parameters.

While all of the 13 systems include General Title Information, only the DRA system distinguishes these data from medium-specific title information, such as the book number or narrator, which can vary for each production of the title. In all of the other systems, General Title Information is stored as part of the record that provides information on a particular book in a particular medium. Therefore, in almost all of the systems, General Title Informa-

tion is stored redundantly for each production of a work in a different medium.

2.1.01-.03. Title Data Elements

All systems store book titles (2.1.01). However, none of the systems provide online access to book data by the full title or words from the title. In at least two systems, a title search key (2.1.02) is used for this purpose. A title search key consists of fragments of words from the book title that are combined according to specific rules. (These are described further in Chapter 9, Section 8.2.)

The non-filing indicator data element (2.1.03) is a unique feature in the DRA system. It is used by the system user to specify the number of letters and spaces (up to nine) in a title that are to be ignored in alphabetical sorts of the titles. In other systems, the library staff generally key in leading articles at the end of the title (e.g., Great Gatsby, The) or leave them out of the title entirely (e.g., Great Gatsby).

2.1.04 and 2.1.05. Author Name Data Elements

Author names are stored in most systems, and the space that is allocated for this field ranges from 15 to 65 characters. Author names are generally stored in inverted form (last name, first name, middle name) to facilitate generation of author sorts. At least three systems provide access to book data by author name. Both the DRA and Massachusetts systems use an access key that is based on the author's name and that is automatically derived by the system.

2.1.06-.09. Information on the Book from Which a BPH Book is Produced

Books printed, pressed, or recorded by NLS/BPH and NLS/BPH libraries are productions of previously published works. Information on the print publication from which an NLS/BPH book is produced can be used to answer inquiries about a book's bibliographic antecedents. The data elements used to capture this

original production information are displayed below, in Exhibit 34, for each of the two system that cover this requirement.

Exhibit 34. Data Elements Relating to the Publication from Which an NLS/BPH Book is Produced

Data Element	DRA System	Pennsylvania System
Publisher	X	X
Place of Publication	X	X
Year of Publication	X	X
Edition	X	-

2.1.10. Reading/Grade Level

This data element is used to indicate level of reading difficulty for a book and/or the primary audience for whom the book is intended. Its main purpose is to aid in the selection of books for borrowers. In practice, this field is applied mainly in selections for juvenile borrowers. Most reading level categories are based on educational grade levels, as was described earlier in the Borrower Database section.

The reading/grade level categories assigned to books correspond generally to the reading/grade level categories assigned to borrowers. In the Pennsylvania system, however, there are 15 categories for juvenile books and only 10 for juvenile borrowers, as illustrated in Exhibit 35. This approach was taken because the staff wanted to reflect the range of grade levels covered in juvenile books, to be used in matches for young readers who may want books at both the high and low ends of reading difficulty for their grade levels. In this coding system, for example, borrowers in the 2nd grade are eligible to receive books in categories 1, 2, 3, 4, and 5, which together represent a span of grade levels from kindergarten to 5th.

Exhibit 35. Pennsylvania System Reading/Grade Levels

				PATRON GRADE LEVEL CODES								
	CODE	GRADE	OK	1	2	3	4	5	6	7	8	9
B	1	K-3	X	X	X	X						
J	2	1-3		X	X	X						
J	3	PRE-2	X	X	X							
K	4	2-4			X	X	X					
	5	2-5			X	X	X	X				
G	6	3-5				X	X	X				
R	7	3-6				X	X	X	X			
A	8	4-6					X	X	X			
D	9	4-7					X	X	X	X		
E	10	4-8					X	X	X	X	X	
	11	5-7						X	X	X		
L	12	5-8						X	X	X	X	
E	13	5-9						X	X	X	X	X
V	14	6-9							X	X	X	X
E	15	7-10								X	X	X
L												

2.1.11. Exclusion Indicators

This set of elements (or values within an element) is used to indicate the presence or absence of certain characteristics of books that some borrowers might find objectionable. As noted earlier in the Borrower Database section, (Section 1.2.04), these include notations for sex, violence, rough language, length of book (long/short), and fiction/non-fiction. Two exclusion criteria--male/female narrator and foreign (accented) narrator--apply to specific media for a title and are described later in this section.

These characteristics are usually indicated by Yes/No flags in a series of fixed positions or fields. From two to eight exclusion indicators (including those that are medium-specific) are used among the systems.

2.1.12-.14. Subject Information

Three methods of presenting information on the subject content of books are used in one or more systems: (1) subject codes; (2) subject headings; and/or (3) classification numbers. The main subjects of a book are represented by codes that correspond to the subject interests specified in borrowers' reading interest profiles. (See Section 1.2.03.) They are used primarily in book selection for borrowers by staff or the system. These codes are used for books in at least nine of the systems, and the number of codes that can be assigned per book ranges from three to eight. The average is about four codes per book. In the Massachusetts system, each of the subject interest codes can have a prefix of "P" or "S" to indicate whether the code represents the primary or secondary subject of the book.

These subject codes are frequently used in the preparation of subject "bibliographies"--files of titles grouped into subject categories, as illustrated in Exhibit 36. These subject bibliographies are generally constructed by the system from the Book Database. In several systems, these bibliographies can be displayed online or offline, for use in book selection or for responding to borrower inquiries (e.g., "what books do you have on World War I?").

Exhibit 36. Schematic of Subject Bibliography Files

Subject Category 010	Subject Category 020
Title ID1	Title ID1
Title ID2	Title ID2
Title ID3	Title ID3
.	.
.	.
.	.
.	.

Subject headings and classification numbers are not used in automatic selection but help staff in selecting books for borrowers. The Pennsylvania system is the only one that stores Library of Congress subject headings. The Massachusetts and Pennsylvania systems are the only ones that store Dewey classification numbers.

2.1.15. Automatic Selection Allowed

A one-character Yes/No flag is used to indicate whether or not automatic selection is allowed for a book. This feature is used in at least two systems so that certain types of controversial books are selected only by borrowers or the staff.

2.1.16. Series Information

Some titles are part of a series intended to be read in a particular sequence. While a majority of libraries stated that the ability to send books in a series to borrowers in the proper order is important, this capability is not provided by any system. No system stores series information (e.g., name of the series; a book's place in the sequence of the series; references or links to other books in the series) in a separate data element, although some series information is entered by Alabama and Illinois staff in a Notes field.

2.1.17. Notes/Annotation

At least four systems provide for notes or annotations that can be used by staff in book selection. The field, which usually includes a brief description of the book contents, is allocated 40 characters in the Alabama, Cincinnati, and Michigan systems, and 575 characters in the DRA system. The book database in the Massachusetts system currently includes a one-character field that is used to alert staff to the existence of additional information on the title that is maintained in a manual file.

The data elements to be considered in the design and definition of Title Data Per Medium are identified below.

2.2 TITLE DATA PER MEDIUM		
2.2.01	Book number	Descriptive Information
2.2.02	Medium	
2.2.03	Recording speed	
2.2.04	Language	
2.2.05	Narrator name	
2.2.06	Narrator exclusion indicators	
2.2.07	Number of containers and/or volumes per copy	
2.2.08	Re-issue information	
2.2.09	Same title in other media	
2.2.10	Other titles on same disk or cassette	
2.2.11	Master/submaster held	Inventory Information
2.2.12	Number of copies owned	
2.2.13	Number of copies checked out	
2.2.14	Number of copies available for check-out	
2.2.15	Number of copies in repair	
2.2.16	Number of copies lost or stolen	
2.2.17	Number of times circulated	
2.2.18	Borrower ID for requests	Request and Reserve Information
2.2.19	Date of request	
2.2.20	Source of request	
2.2.21	Number of requests	
2.2.22	Borrower ID for reserves	
2.2.23	Date of reserve	

Data elements in this section relate to the production of a work in one of the following five media: cassette; disk; braille; large print; and reel-to-reel tape. Although all systems provide for medium-specific information, they differ in the number of media that they accommodate. The number ranges from two to

five. As shown earlier, the data elements in this section have been grouped into three categories:

- Descriptive information
- Inventory information
- Request and Reserve information

These three types of Title Data Per Medium are sometimes stored separately. For example, there are three files in the DRA system; there are two--one for descriptive and inventory information, another for request and/or reserve information--in the Alabama, Colorado, and Albany systems; and a single file is used in the Michigan system.

Before we introduce and discuss the individual Title-Data-Per-Medium data elements, it is worth commenting on the two major approaches that are taken in handling inventory data--data on the numbers of copies that are or are not available for circulation. In some systems, the inventory data are stored as part of title-data-per-medium (Level 2 from Exhibit 32). In other systems, they are stored as per-copy data (at Level 3). In the DRA and Wisconsin systems, data are stored at both levels. The primary difference between these two implementation approaches is that, at Level 2, inventory data are aggregated for all copies of a book in a given medium, whereas, at Level 3, inventory data are stored for each copy of a book in a given medium. Exhibit 37 illustrates this difference by showing how inventory data on four copies of one book would be stored in two systems, each of which uses a different method. (Exhibit 37 shows only the per-copy inventory data for the DRA system. As already mentioned, aggregrate data are also maintained.)

Exhibit 37. Alternative Approaches to Handling Inventory Data

Example: The library has four copies of book RC 11500; two are checked out, one is in repair, and one is available for check-out.

In Pennsylvania System

Inventory data in book record for RC 11500:	Copies owned:	4
	Copies on hand:	1
	Copies lost:	0

In DRA System

Inventory data in copy records for Book RC 11500:

	Copy 1	Copy 2	Copy 3	Copy 4
Status:*	A	R	P	P
Date of Status Change:	1/6/1981	1/6/1981	1/6/1981	1/6/1981
Borrower ID:			SMITHJ01	JONESB01

*Status codes: A = Available for check-out; P = Checked out to borrower R = Sent for repairs; F = Checked out to borrower but needs repair; W = Withdrawn

2.2.01 to 2.2.10. Descriptive Information

2.2.01. Book Number. The book number is a code that uniquely identifies a book in a particular medium. The NLS/BPH-assigned numbers are a combination of a prefix and a stem: the prefix is a two- or three-letter code; the stem is a four- or five-digit number. Examples are given on the following page.

RC 14714
RD 13849
BR 3911
BRA 13826

The letter prefixes indicate the book medium and, for recorded media, the speed; the stem numbers are assigned sequentially within a medium. Exhibit 38 lists the NLS/BPH book number prefixes and their meanings.

Exhibit 38. NLS/BPH Media Indicators

Prefix	Medium	Speed
CB	cassette	1-7/8 inch per second (IPS)
RC	cassette	15/16 IPS
TB	disk	16-2/3 revolutions per minute (RPM)
RD	disk	8-1/3 RPM
BR	press braille	
BRA	hand-copied braille	

All systems provide for this unique book number. In some systems, the book number is stored in an eight-character field exactly as it is assigned by NLS/BPH. In others, which do not store data on hand-copied braille (the BRA medium), the NLS/BPH book numbers are carried in a seven-character field. In a few systems, the two- to three-letter prefix is converted into a one-digit media code, which allows the book number to be stored in a six-character field. Exhibit 39 shows how a book number is stored in three different systems.

Exhibit 39. Examples of Book Numbers

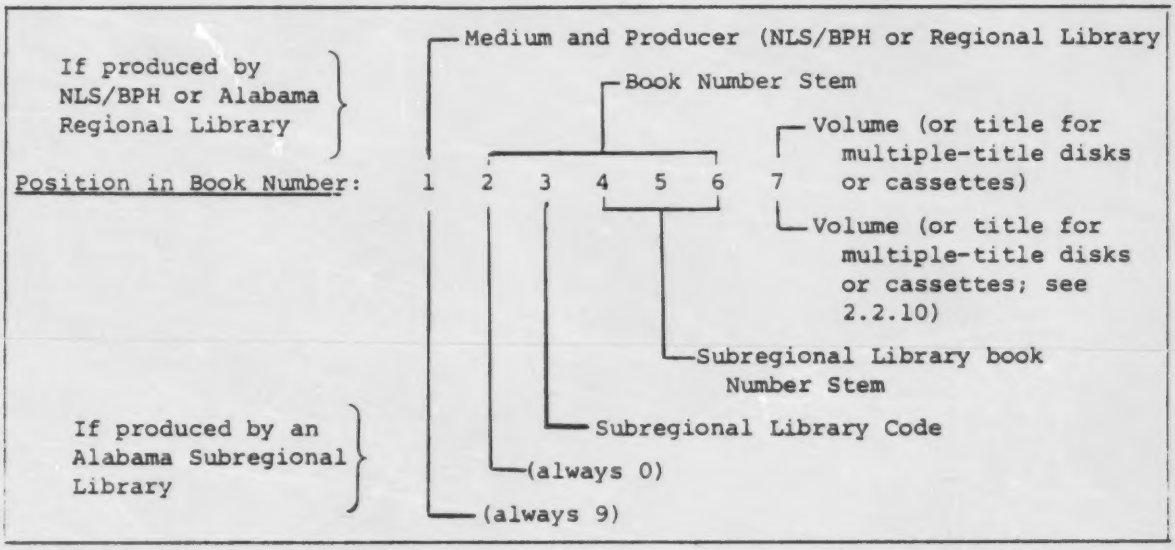
NLS/BPH Book Number: RD 13923		
Book Number	Character Length	System
RD 13923	8	Massachusetts
RD13923	7	Pennsylvania
113923	6	Michigan

Alabama employs a more elaborate coding system for both book numbers and magazine IDs. The position of letters or numbers in the seven-character string are used to encode the following information:

- whether the item is a book or magazine;
- whether the item was produced by NLS/BPH, the Regional Library, or an Alabama Subregional Library;
- the medium of the book (or magazine);
- the volume number of the book.

The construction of the Alabama code for a book is shown below in Exhibit 40.

Exhibit 40. Book Number Construction in the Alabama System


If produced by NLS/BPH or Alabama Regional Library
Position in Book Number:
1 2 3 4 5 6 7
Medium and Producer (NLS/BPH or Regional Library
Book Number Stem
Volume (or title for multiple-title disks or cassettes)
Volume (or title for multiple-title disks or cassettes; see 2.2.10)
Subregional Library book Number Stem
Subregional Library Code
(always 0)
(always 9)
If produced by an Alabama Subregional Library

2.2.02 to 2.2.03. Medium and Speed. Most systems use the prefix of the book number to identify the medium of a book. In the DRA System, this information is also stored in a separate field. The field is filled with the appropriate one-character medium code automatically by the system after the book number is entered. In two other systems, special information is carried about book media. The Alabama system has a one-character Yes/No field that indicates

whether or not a book is a "double vision" book (i.e., includes both print and braille). A one-character field is used in the Cincinnati book database to indicate whether a book contains print and braille; a print copy of the title in the container; or no printed matter.

The speed of recorded books is also identified by the book number prefix (as illustrated earlier in Exhibit 38). Some systems have converted the prefixes to numeric codes which group all books of one medium, regardless of speed, into one category (e.g., CB and RC books are grouped into one cassette-medium category). Because all borrowers who are served by a library may not have access to machines that play books of any speed within a medium, there may be a requirement to carry data on the speed of each recorded book. For example, in the Pennsylvania system, book speed data are stored in a separate field. A one-character code is used to identify which of four speeds (16-2/3 RPM, 8-1/3 RPM, 1-7/8 IPS, 15/16 IPS) applies to a book.

2.2.04. Language. As already discussed in the Borrower Database section (Section 1.2.01), a number of languages are available in the NLS/BPH and Regional Library book collections. One- or two-letter codes are commonly used to identify the language of a book.

2.2.05 and 2.2.06. Narrator Information. The majority of the systems include data on the narrator of books in recorded media. These data can cover:

- Narrator name. Two systems provide for the identification of the narrator. (A number of narrators are quite well-known and popular with readers in the BPH community.) The DRA system allocates 65 characters for the narrator name field. The Cincinnati system uses 10 characters for this field, which is also used at times to store alternate book numbers for re-issued books.
- Narrator voice characteristics. Because some borrowers with hearing impairments have difficulty hearing female voices, most systems identify the narrator's sex. Several systems also provide for the identification of narrators with foreign accents.

2.2.07. Number of Containers and/or Volumes. Lengthy recorded books must often be mailed in more than one container. Braille and large-print books frequently require more than one volume and can also require multiple containers for mailing. Therefore, a system must have available data on the number of containers for purposes of producing the appropriate number of mailing cards. Most systems store container data in a two-digit field.

Because the number of volumes and mailing containers are usually different for braille and large-print books, in some systems (e.g., DRA and Pennsylvania) these counts are stored in separate fields.

2.2.08. Re-issue Information. Older recorded books that are popular are sometimes re-issued, so that borrowers can continue to enjoy them with improved sound quality. The new version of a book is re-cataloged and assigned a new book number. The presence in the database of "duplicate" titles can pose some problems in the book check-out function. For example:

- Libraries generally prefer to send the latest issue of a book. Ideally, it should be possible to translate automatically the older book number into the number of the most recent issue.
- Because the library can have all copies of a re-issued book out in circulation, but still have available copies of an earlier version, the system should be able to identify any copies (in good condition) that are available.
- During book selection, the staff and/or system can inadvertently select a re-issued title that a borrower has already read in an earlier or later version, so that a correspondence table or some other cross-reference system needs to be available.

Although the need for handling re-issue data is generally recognized, such data are stored in only eight of the 13 systems, as described below.

- Alabama uses a linked-record structure to connect different versions of multiple-issue books. An "Other-Book Number" field in the earlier (original) version's book record contains the book number of the latest re-issue, and this field in the latest re-issue contains the book number of the original issue:

Version of Book	Sample Book Number	"Other-Book Number" Field
Original	1023000	1216810
Re-issue	1216810	1023000

- In two systems--Michigan and Wisconsin--older versions of a book are re-numbered to match the book number of the latest re-issue. The older (original) book number is stored in a special field in the book record. Two other systems--Tennessee and Texas--re-number the older versions but do not store the original number.

- The Pennsylvania system has seven fields in which the book numbers of up to seven versions of a re-issued work can be stored. (All of these are added to borrowers' Has-Had lists when books are checked out.)

- The DRA system has a system-maintained index of titles and book numbers, which relater not only versions of re-issued books but also versions of a book in different media.

In two other systems, re-issue data are stored for display purposes only (e.g., during staff book selection). The Cincinnati system uses the Narrator field (2.2.05) to store the book number of the latest re-issue in the book record of an earlier version. In the Massachusetts system, re-issue information is added at the end of the title field.

2.2.09. Same Title in Other Media. Many popular books have also been produced in several media. Each production of a work in a different medium is cataloged as a unique work and receives its own book number. Libraries are, therefore, faced with problems similar to those presented by re-issues. Borrowers who have read a book in one medium can have the same book in another medium inadvertently selected for them if there is no mechanism for correlating titles in different media.

Although NLS/BPH now assigns identical book number stems to different versions of the same title in recorded media (e.g., RC 12345 and RD 12345 represent the same title in cassette and disk format, respectively), most libraries still feel that relating versions of the same book in different media is important for circulation functions. Such linkages are accommodated in five systems, as described below.

- The Alabama system uses a linked-record structure similar to the one that is used to relate re-issues. Each book record has three fields in which the book number of the same title in another medium is stored. The Neoterics system also stores the book number of other media for a title in this way.

- The DRA system uses an internally derived title-book number index to relate versions of the same title in different media.

- Although the Colorado system does not actually store data that relate versions of a title in different media, it is programmed to recognize that the latest RC and RD book numbers represent the same title, if the book number stems are the same. In maintaining the Has-Had file, it will place both numbers in a borrower's record.

2.2.10. Other Titles on the Same Disk or Cassette. Some recordings, especially those for children, contain more than one title. Ideally, a system should be able to provide detailed information on every title on a disk or

cassette, a feature that is provided in several systems. In most of these systems, the system user must specify that a multiple-title disk or cassette is being entered (since most systems are programmed to reject attempts to enter a book under a book number already in use).

Some systems (in addition to, or instead of, providing separate records for each title on multiple-title disks or cassettes) provide for a field that contains the number of titles in a recorded book.

2.2.11 to 2.2.17. Inventory Information

2.2.11. Master/Submaster Held. The original recording of a book is called the master. If a title has been produced by the library, the master is usually held as an archival copy; it does not circulate. The submaster is a duplicate of the master from which circulating copies are produced; it also does not circulate. The DRA system provides two one-character fields in which a Yes/No flag indicates whether or not the Library owns a master and/or submaster copy.

2.2.12 to 2.2.16. Inventory Control Data. At any given time copies of a book can be in one of several disposition categories: available for check-out; checked out; sent for repair; lost or stolen (or otherwise removed from the collection).

To assist in inventory control and check-out functions, all systems provide for information on the numbers of copies in various disposition categories, as well as the total number of copies owned, for each book. Although the systems vary in the number of disposition categories they accommodate, the use of these categories is generally the same for all systems: to keep track of how many copies of a book a library owns and how many are available for

check-out. These fields are usually two or three characters and are stored in the book record. DRA is the only system to keep this inventory data in a separate holdings file.

2.2.17. Number of Times Circulated. Data on the number of times copies of a book have circulated to borrowers are used for two purposes: to produce statistical reports on circulation for NLS/BPH and/or other agencies and to produce reports that are helpful to library management in collection development and weeding. A number of different sets of time periods are used among the systems for cumulating these data, including:

- current six months, last six months, and six months prior to last six months
- current six months and total for all preceding periods
- current year, previous year, and two years ago
- current month and current year
- current year

Most systems store these counts in three- to five-character fields in the book record. In the DRA system, the data are recorded in per-copy records; circulation figures for all copies of a book are totaled by special report-generation programs.

2.2.18 to 2.2.23. Request and Reserve Information

The basic data elements required for maintaining request and reserve information (borrower ID, book number, date of request/reserve, source of request) were discussed in the Borrower Database (Section 1.3). One data element relating to requests that is stored in the book record by at least six systems is the number of requests or reserves for that book. This information can be used by library management to gauge demand for book titles and thereby tailor library collection development and weeding

policies. Four of the six systems store the number of currently outstanding requests or reserves, while the two others store the number of requests or reserves over a period of time, e.g., in Massachusetts, current six months and total for all preceding periods; and in Wisconsin, current year. Three systems--Alabama, Michigan, and Massachusetts--keep separate counts of requests by source of the request: borrower-generated and staff-generated, in Alabama and Michigan; borrower- and system-generated in Massachusetts. Massachusetts and Pennsylvania have systems that store data on the number of reserves for books. In most of the systems, a three- or four-character field is used to store the request and reserve counts.

The data elements to be considered in the design and definition of Per-Copy Data are identified below.

2.3 PER-COPY DATA	
2.3.01	Copy number
2.3.02	Availability status
2.3.03	Date of last change in availability status
2.3.04	Borrower to whom copy is checked out
2.3.05	Number of times circulated

As mentioned earlier, some systems maintain inventory data at the copy level. Some Libraries believe that using per-copy data supports better inventory control. The Wisconsin and DRA systems have a record on every book copy in every medium: the Pennsylvania system maintains per-copy data only for braille and large-print books.

These three systems differ in the amount of information that they include in per-copy records. Exhibit 41 shows the per-copy data elements in the Wisconsin and DRA systems. Pennsylvania stores an entire book record (including general and medium-specific book data elements) for each copy of its braille and large-print titles.

2.3.01. Copy Number

The copy number is a code that uniquely identifies each book copy or container (or a braille volume in the DRA system). Three methods have been used in assigning copy numbers:

- Wisconsin uses a three-digit number that is appended to the regular book number;
- DRA uses a nine-digit number to identify each container or braille volume in the collection; the numbers are pre-printed in OCR-font type on adhesive labels affixed to items as they are added to the library inventory;

- Pennsylvania includes a nine-character field in the book record, where each bit position identifies a particular copy of a braille or large-print book; up to 72 different copies of a book can therefore be accommodated.

Exhibit 41. Per-Copy Data Elements in the DRA and Wisconsin Systems

1. The DRA System

FIELD

Book #:
Volume #:
Holding Agency:*
Owning Agency:*
Status: ——→
Patron:
Last Status Change
Circulation this month
Circulation this year
Source of issue

Status Codes:
A = Available
P = Charged to patron
R = Charged to repair
F = Charged to patron but needs repair
W = Withdrawn

*These data elements will be used for networking functions. They were not being used at the time that this Guide was written.

2. The Wisconsin System

```
**********BPH COPY FILE**********
* FILE NAME IS BPHFCOPY.CPY
* RECORD LENGTH IS 12
* RECORD KEY IS BOOK-NO
  01  WS-COPY-RECORD.
      05  BOOK-NO.
          10  FORM          PIC X
          10  LC-NO         PIC X(5).
          10  VOL           PIC X(2).
          10  COPY          PIC X(3).
      05  LOCATION          PIC X.
*S=SHELVED, R=BEING REPAIRED, L=ON LOAN, D=DISCARDED.
```

2.3.02 to 2.3.04. Disposition Information

Disposition information provides the same inventory information for a copy of a book that the inventory control data elements (2.2.12 to 2.2.16) do for all copies of a book. The first of these three data elements is used to specify the current disposition of the book. The disposition categories available for use correspond to the categories used for inventory data at the per-medium-title level (2.2.12 to 2.2.16). They are identified by one-character codes.

The date of last change in availability status (2.3.03) is provided for only by the DRA system, where it is stored in the format MMDDYYYY.

The last data element, borrower to whom the book is checked out, is also provided for only in the DRA system. The eight-character DRA borrower ID is stored in this field when the copy is checked out.

2.3.05. Number of Times Circulated

This field stores data for one copy or one container.

3.0 MAGAZINE DATA ELEMENTS

3.0 The system must provide for the development of a database or set of files that contain information on each magazine.

Information on a given magazine is covered by a set of over 20 possible data elements that we have grouped into these four levels:

3.1 General Title Information
3.2 Title Data Per Medium
3.3 Per-Issue Data
3.4 Per-Copy Data

Some of the same considerations that apply to the Book Database also apply to magazines. The major data elements for magazines are listed in the following sections and a few elements are discussed briefly.

The data elements to be considered in the design and definition of General Title Data are identified below.

3.1 GENERAL TITLE DATA	
3.1.01	Title
3.1.02	Magazine code
3.1.03	Publisher of the print publication from which the braille, large-print, or recorded version is produced
3.1.04	Frequency of publication
3.1.05	Age/interest level
3.1.06	Notes/annotation

The General Title Data cover information that is the same for all versions of a magazine, regardless of the medium in which they are produced. Two of these elements are highlighted in the discussion below.

- 3.1.02. A three-letter, mnemonically derived code that uniquely identifies a magazine title. NLS/BPH assigns this code to those magazine titles for which it sponsors the production. Regional Libraries assign their own codes to titles that they produce themselves, although Libraries using the DRA system have adopted a standard set of magazine codes for locally produced magazine titles.

- 3.1.05. The age/interest level categories used for magazines are generally less detailed than those used for books. The typical categories are Adult and Juvenile.

The data elements to be considered in the design and definition of Title Data Per Medium are identified below.

3.2 TITLE DATA PER MEDIUM		
3.2.01	Medium	Production Information
3.2.02	Language	
3.2.03	Distribution type	
3.2.04	Producer of the braille, large-print, or recorded magazine	
3.2.05	Producer address	
3.2.06	Subscriber (borrower) ID	Subscriber Information
3.2.07	Subscriber priority ranking	

The Title Data Per Medium elements represent information that pertains to a production of a magazine title in a particular medium. The elements can be divided into two groups:

- Production Information. Provides data on the magazine itself.
- Subscriber Information. Provides data on those borrowers who subscribe to the magazine and, for magazines circulated by the Library, their priority ranking (see Section 1.6.04 in the Borrower Database).

The medium (3.2.01) is usually identified by a one-digit numeric code appended to the magazine code (3.1.02).

The Distribution Type data element (3.2.03) identifies how and by whom copies of the magazine are sent to subscribers:

- Distributed by Producer. These issues are sent directly to subscribers by the producer of the magazine. A subscriber keeps or discards each issue.

- Distributed by Library. These issues are sent to subscribers by the Library. Subscribers keep or discard each issue.

- Circulated by Library. These issues are checked out to subscribers, who return them to the Library for further circulation.

Data elements 3.2.04 and 3.2.05 are stored so that producers can be notified of subscription additions, deletions, and modifications.

The data elements to be considered in the design and definition of Per-Issue Data are identified below.

3.3	PER-ISSUE DATA	
3.3.01	Issue number	Descriptive Information
3.3.02	Issue date	
3.3.03	Master/Submaster held	Inventory Information
3.3.04	Number of copies owned	
3.3.05	Number of copies checked out	
3.3.06	Number of copies available for check-out	
3.3.07	Number of times circulated	
3.3.08	Borrower ID	Request Information
3.3.09	Date of request	

The Per-Issue Data elements contain information pertaining to an issue of a magazine in a particular medium. The elements can be divided into three groups:

- Descriptive Information. These elements identify a particular issue of a magazine.
- Inventory Information. These elements provide data on the number of copies that a Library owns and that are available for check-out.
- Request Information. These elements provide information on borrower requests for a magazine issue.

In some systems, the issue date or volume number is combined with the magazine code (3.1.02) and the medium code (3.2.01) to produce a magazine issue ID, which is stored in a record for that issue.

For example, in the Alabama system, 6ABC011 identifies the November 1980 issue, in cassette, of the ABC magazine. This magazine-issue ID is constructed as follows: position 1 represents the medium; positions 2-4, the magazine title code; position 5, a code for the last digit of the issue publication year; and positions 6-7, the month of issue publication.

The data elements to be considered in the design and definition of Per-Copy Data are identified below.

3.4	PER-COPY DATA
3.4.01	Copy number
3.4.02	Availability status
3.4.03	Date of last change in availability status
3.4.04	Borrower to whom copy is checked out
3.4.05	Number of times circulated

The Per-Copy Data elements contain information pertaining to one copy of a magazine issue in a particular medium. The data elements correspond to the Per-Copy data elements used for books. (See Section 2.3 in the Book database.)

4.0 EQUIPMENT DATA ELEMENTS

> 4.0 The system must provide for the development of a database or set of files that contain information on each type and/or unit of equipment.

Information on equipment is covered by a set of over 20 possible data elements that we have grouped into these two levels:

> 4.1 Per-Model/Accessory Type Data
>
> 4.2 Per-Unit data

The major data elements for equipment are listed in the following sections. A few elements are discussed briefly.

The data elements to be considered in the design and definition of Per-Model/Accessory Type Data are identified below.

4.1	PER-MODEL/ACCESSORY TYPE DATA	
4.1.01	Model number/Accessory code	Descriptive Information
4.1.02	Number of units owned	Inventory Information
4.1.03	Number of units available for check-out	
4.1.04	Number of units checked out	
4.1.05	Number of units in repair	
4.1.06	Number of machines awaiting repair	
4.1.07	Number of units damaged beyond repair	
4.1.08	Number of units with unknown locations	
4.1.09	Number of units stolen	
4.1.10	Number of units lost in mail	
4.1.11	Number of units transferred in	
4.1.12	Number of units transferred out	
4.1.13	Number of units re-assigned	
4.1.14	Borrower ID	Request Information
4.1.15	Agency	
4.1.16	Priority	
4.1.17	Date of request	

The Per-Model/Accessory Type Data cover information pertaining to a particular machine model or accessory type. As shown above, these data can be divided into three groups:

- Descriptive Information. This element identifies a machine model or accessory type.
- Inventory Information. These elements provide data on the numbers and disposition of equipment units owned by a library.
- Request Information. These elements provide information on borrower requests for a particular type of machine.

4.1.01. Model Number/Accessory Code

Model numbers are three- or four-character codes that uniquely identify a particular machine model. The standard codes assigned to machine models by NLS/BPH are used in all libraries that maintain machine data. However, different types of accessories are not assigned unique NLS/BPH numbers, and libraries that maintain data on accessories generally use locally assigned one- or two-character codes for accessory types. Examples of machine model numbers and accessory codes are provided below in Exhibit 42.

Exhibit 42. Examples of Model Numbers and Accessory Codes

(1) Machine Model Numbers, as stored in the Neoterics system:	(2) Accessory Codes Used in the DRA system:
A-71 C-76	: 3 = headphone 4 = pillow speaker 5 = remote control unit :

4.1.02 to 4.1.13. Inventory Information

These fields cover statistical reporting categories included in the NLS/BPH-required monthly or semi-annual equipment reports.

4.1.14 to 4.1.17. Request Information

DRA is the only system that provides for borrower machine requests, data that can be used in the NLS/BPH monthly machine reports. A four-character code representing the agency through which the request is being processed (and from which the machine will eventually be issued) is stored in an Agency field (4.1.15). The priority field (4.1.16) is used for a one-character code that indicates whether the request is to receive high priority ("H") or low priority ("L").

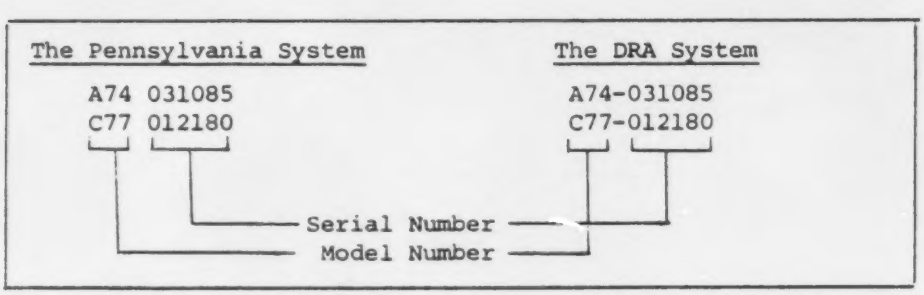
The data elements to be considered in the design and definition of Per-Unit Data are identified below.

4.2 PER-UNIT DATA

- 4.2.01 Machine number
- 4.2.02 Date added to collection
- 4.2.03 Number of times checked out
- 4.2.04 Availability status
- 4.2.05 Date of last change in availability status
- 4.2.06 ID of borrower to whom machine is checked out
- 4.2.07 Agency
- 4.2.08 Notes

Per-Unit Data pertain to individual equipment items and are used primarily for inventory control purposes. The machine number (4.2.01), a six-digit number appended to the model number, uniquely identifies a particular machine. Samples are provided below in Exhibit 43. The Agency data element (4.2.07) contains a four-character code of the agency that issued the machine. The availability status categories stored in data element 4.2.04 correspond to the disposition categories listed earlier in Section 4.1 (data elements 4.1.03 to 4.1.12). The Wisconsin system provides a 40-character Notes field (4.2.08) for use in storing additional information on each machine unit.

Exhibit 43. Examples of Machine Numbers



CHAPTER 8.

CONSIDERATIONS FOR CIRCULATION SYSTEM FUNCTIONS

In the following sections, we address requirements for the following system functions:

5.0 The system must provide for the Selection of books.

- 5.1 The system must accept and store relevant data on titles that are requested by borrowers and on titles that are selected for borrowers.
- 5.2 The system must provide assistance to staff members in the identification of potentially suitable titles for borrowers who have books selected on their behalf.
- 5.3 The system must provide for the creation and maintenance of a Request File--data on requests and selections--for use by the system at Check-Out.

6.0 The system must provide for the Check-Out of books.

- 6.1 The system must identify those borrowers due for service.
- 6.2 The system must determine for each title the availability of a copy, in an appropriate medium, for assignment to a particular borrower.
- 6.3 The system must make the needed number of book assignments per borrower on the basis of priorities established by the library.
- 6.4 The system must execute updates to the appropriate system files, to reflect changes in the status of data in the inventory and borrower records.
- 6.5 The system must print cards in an order that facilitates retrieval by library staff members of items from the shelves, for use in mailings to and from a borrower.

7.0 The system must provide for the Check-In of books.

7.1 The system must update records in files that are affected by the return of a book.

7.2 The system must record a temporary shelf order or the location of copies, to eliminate the need for re-shelving returned books prior to the next Check-Out.

Requirements for any given library may also involve the specification of check-out and check-in functions for magazines that are circulated and for equipment that is placed on loan. Such requirements represent a subset of those required to support the circulation of books. Therefore, we have concentrated in this section on the handling of books--the basic requirement for all libraries. In each of the sections, we illustrate from available interview materials and documentation, how these functions have been implemented in several different systems.

5.0 SELECTION OF BOOKS

As indicated earlier, in Chapter 7, a potential source of confusion in terminology arises from the use of the terms "requests" and "selections." In this section, we use the term "selection" in a broad sense, to apply to the system function that handles both the requests by borrowers and the selections that are made for borrowers. However, in many (but not all) systems, the data that are stored on these requests and selections are referred to collectively as Request File records. In the discussion to follow, we will also use this term.

The focus in this section is on book requests and selections, and on the system function called Book Selection. The discussion of borrower-originated requests can be adapted to cover requirements for handling requests for magazines and/or equipment.

The major requirements covered in this section are shown below.

5.1	The system must accept and store relevant data on titles that are requested by borrowers and on titles that are selected for borrowers.
5.2	The system must provide assistance to staff members in the identification of potentially suitable titles for borrowers who have titles selected on their behalf.
5.3	The system must provide for the creation and maintenance of a Request File--data on requests and selections--for use by the system at Check-Out.

It is important to note that these requirements, more than any others identified in this Guide, reflect the particular design choices made in the 13 systems that we studied. They represent a "super set" of requirements that may not necessarily be met by any given system. These requirements

would not necessarily be appropriate for other system design approaches, particularly where systems provide for interactive selection/check-out operations, for each borrower, rather than for "automatic" checkout operations in batch mode for groups of borrowers.

5.1 The system must accept and store relevant data on titles that are requested by borrowers and of titles that are selected for borrowers.

5.1.1 The system must provide for borrower-originated requests.

5.1.2 The system must provide for staff-originated requests (i.e., selections)

5.1.1 Borrower-Originated Requests

The system must permit staff members to enter data on titles that have been requested by a borrower. Consideration needs to be given to the accommodation of urgently requested titles, generally referred to as "reserves," for establishing priorities at check-out. The possible data elements that are needed to create a record of requests are listed below in Exhibit 44. (These elements were described earlier, in Chapter 7, Section 1.3.)

Exhibit 44. Typical Elements of Data Included in a Request File Record

Element	Brief Description
Borrower ID	Unique code that identifies borrower by or for whom request is made
Book number	Unique code that identifies book title (and medium) being requested
Date of request	Date that the request is entered into the system
Source of request	Code that indicates whether the request originated with the borrower, library staff member, or the system

Different system implementations vary in the processing steps that are required for borrower requests. For example, in the Pennsylvania system, a number of checks are made at the time a request is entered, to determine whether the title is in the borrower's Has-Now, Has-Had, or Request files and whether it matches any of the borrower's exclusion criteria. The library staff member receives feedback from the system on the suitability of the request and can override the addition of the request to the borrower's request list. In other Libraries, the decision has been made to accept and process any borrower's request, on the assumption that the individual knows what is wanted.

At a minimum, there is a requirement for the system to determine whether the title is a duplicate request, i.e., is already in the Request File. This may be done either at record creation time or later, in the updating of the Request File or at check-out.

5.1.2. Staff-Originated Requests

Selections of titles for borrowers can be made by the library staff without use of the system. For example, paper records of the borrower's interest profile and of selected book data can be used "offline" to identify one or more suitable titles. Once titles are selected in this mode, the system must provide the same capabilities as discussed above in Borrower-Originated Requests, for the staff member to key in relevant data.

As discussed earlier in Chapter 7, consideration also needs to be given to the need for a distinction to be made in the system between requests that originate with the borrower and those that originate with the staff. (See Chapter 7, Section 1.3.03.)

5.2 The system must provide assistance to staff members in the identification of potentially suitable titles for borrowers who have titles selected on their behalf.

5.2.1 The system must provide staff members with the means to review relevant borrower and book data in the process of their making selections for the borrower.

5.2.2 The system must perform automatic selection of titles, according to a set of pre-established principles, that are suitable for each borrower designated to receive automatic selection service.

5.2.1 and .2. Computer-Assisted Selection

We have presented requirements in this area for two different roles that can be specified for a system. In actual fact, any number of variations on these two roles can be specified. As discussed earlier, in Part II of this Guide, the definition of "computer-assisted" involves specification of the degree to which the system performs automatically some or all of the operations to match data that represent a borrower's interests with data that represent the contents and characteristics of a book.

Among the possible variations in roles are these:

- A staff member must be able to review at the terminal some or all information contained in the borrower's interest profile and be able to request a display of titles and other selected book data in the subject categories of interest for review and selection.

- A staff member must be able to specify several criteria, e.g., subject, medium, reading/education level, exclusion criteria, for a given borrower or group of borrowers for use by the system in producing a subset of titles that can be displayed at the terminal for review and selection by a staff member.

- A system must perform the necessary matches automatically ("Automatic Selection") using multiple criteria from a borrower's interest profile to identify a set of suitable titles to be recorded for that borrower in a Request File (or assigned for immediate check-out).

- A system must perform all of the necessary matches automatically, using multiple criteria from a borrower's interest profile to identify a set of suitable titles that are then reviewed by a staff member ("Interactive Automatic Selection") for final changes or final selection.

The major data elements used in producing these manual (i.e., staff) or automatic matches are identified on the following page in Exhibit 45. These were discussed earlier in more detail, in Chapter 7. In Exhibit 46, we provide a sample interaction for automatic selection.

Exhibit 45. Summary of Major Data Elements Used in Selection

DATA ELEMENTS			NOTES
Name	Borrower	Book	
Borrower ID	x	-	Unique code that identifies borrower
Book ID	-	x	Unique code that identifies book title (and medium)
Author	-	x	
Language	x	x	Language of book must match a language accepted by borrower
Reading Grade/Level	x	x	Reading/grade level of book must be appropriate for borrower
Subject interests/indicators	x	x	Book must be in one of borrower's specified subject interest areas
Exclusion criteria/indicators	x	x	Book must not contain characteristics (e.g., violence, foreign accented-narrator) that borrower finds objectionable
Media	x	x	Title must be available in a medium accepted by borrower
Request-only borrower	x	-	Books must not be selected for request-only borrowers
Automatic selection accepted/allowed	x	x	Automatic selection must be performed only for those borrowers who accept system-originated requests and on those books for which staff permit automatic selection
Notes	x	x	Staff should review supplementary information on borrower service parameters and book characterstics
Re-issue information	-	x	Latest version of a re-issued book must be selected; title must not be selected if borrower has read an earlier or later version of a re-issued book
Same title in different medium	-	x	Title must not be selected if borrower had read it in another medium
Number of copies available	-	x	Only titles with copies available must be selected

Exhibit 46. Automatic Selection Interaction in the Colorado System

```
ENTER:  TRANSACTION TYPE   BS
        TRANSACTION NAME   21


ENTER PATRON NUMBER OR END. 01204

PATRON 01204 HAS 55 BOOK(S) IN CIRCULATION.
24 A&B REQUEST(S) AND 6 C REQUEST(S)
DATE OF LAST SERVICE HAS 02/05/81

ENTER NUMBER OF BOOKS TO SELECT (ENTER ZERO IF NONE). 3
ARE MAIL CARDS TO BE:
1.  MANUALLY TYPED  2. PRINTED ON HARDCOPY TERMINAL  2
WILL BOOKS BE MANUAL OR AUTOMATIC?  ENTER A OR M.    A
IS BOOK INCREASE TO BE TEMPORARY:       (Y OR N).    N

ENTER PATRON NUMBER OR END. END


ENTER:  TRANSACTION TYPE __
```

5.3 The system must provide for the creation and maintenance of a Request File--records of data on requests and selections--for use by the system in the Check-Out function.

5.3.1. The system must identify borrowers who have fewer than the required minimum number of requests on file.

5.3.2. The system, in automated selection, must determine the number of titles that are to be selected for a given borrower.

5.3.3. The system must determine the availability of copies of selected titles for assignment to borrowers in check-out.

More specific statements of these requirements depend upon a number of implementation considerations, including:

- Is the Request File being maintained by staff for later use by the system in automatic check-out and/or does the system maintain the Request File as part of the check-out function?

- Are selections being made interactively by the staff member for purposes of identifying and checking out an item in a single set of "real-time" operations for each borrower; or does the system provide only for processing of groups of borrowers in a batch mode operation?

6.0 BOOK CHECK-OUT

Check-out involves a set of steps that provides for the assignment of copies of titles to borrowers and the production of cards to be used in the mailing and return of these items. In addition, it involves a set of steps that provides for the maintenance of system files that are affected by the check-out operations.

Although the requirements in this function both influence and are influenced by decisions that are made with regard to the selection function, we have elected to present the check-out function as an independent set of operations. Another factor that influences check-out is the processing mode that is to be used: whether the system is to perform check-out in a batch mode for groups of borrowers; in an interactive mode, for check-out by a staff member for individual borrowers; or in some combination of both of these modes.

Operations to be considered in the design of check-out are described below in this set of requirement areas:

6.1	The system must identify those borrowers due for service.
6.2	The system must determine for each title the availability of a copy, in an appropriate medium, for assignment to a particular borrower.
6.3	The system must make the needed number of book assignments per borrower on the basis of priorities established by the Library.
6.4	The system must execute updates to the appropriate system files, to reflect changes in the status of data in the inventory and borrower records.
6.5	The system must print cards, in an order that facilitates retrieval by library staff members of items from the shelves for use in mailings to and from a borrower.

6.0 BOOK CHECK-OUT

Specific considerations for each of these requirements are addressed in the sections that follow. To illustrate the process as a whole, prior to reviewing its components, we present in Exhibit 47 a brief overview of check-out, as it is defined in one of the systems included in this study.

Exhibit 47. Illustration of Check-Out Function Steps in the DRA System

The DRA check-out program is called the Recharge Batch Stream and is run in batch mode, generally at night. A trained system operator indicates which, if any, set of Calendar Service borrowers is to be served and these are stored in a temporary file of Borrowers Due for Service. The set of Recharge routines are identified below.

FINDIS: Identifies books returned since the last run of Recharge. Adds to the file of Borrowers Due for Service those borrowers who have Turn-Around Service and have returned books.

CREAVL: Creates a list of books for which copies are available (in either the main shelving or mailing room shelving areas).

ISURSV: Assigns reserved books.*

ISUREQ: Processes each borrower, one at a time, and assigns books that have been requested.*

CREPRO: Creates a list of available books for which automatic selection is allowed.

ISUPRO: Performs automatic selection for borrowers who did not receive the expected number of books from ISURSV and ISUREQ.*

PURDUE: Purges the file of borrowers due for service.

CREDUE: Identifies borrowers who did not receive the expected number of books after ISUPRO, and generates a listing.

*At the time each book assignment is made, the system updates all appropriate files, including the borrower's Has-Now data, (e.g., the number of books received, month to date and year to date), Has-Had, and Book Copy files. It also creates a temporary file of information needed to print mailing cards, which are sorted and generated by a different program.

6.1 The system must identify those borrowers due for service.

If several types of service are accommodated by a system (e.g., Turn-Around and multiple frequencies for Calendar Services), then more than one method may be needed for determining whether a borrower is due for service. For example, information may be captured and stored in the system on Turn-Around borrowers who have returned a book and are due for service the next time check-out is performed. However, for Calendar Service borrowers, the system must provide a means for staff to specify (and/or the system to identify) the subset of borrowers to be served during check-out. In one method, used in the Neoterics system, Calendar Service borrowers of a particular frequency (e.g., biweekly) are assigned to one of several service groups (e.g., B1, B2, B3, etc.) for that Calendar-Service frequency. The system operator specifies the group that is to be served when check-out programs are executed.

> 6.2 The system must determine for each title the availability of a copy in an appropriate medium, for assignment to a particular borrower.

A key variable in this requirement is the specification of when the check for availability of a copy is made. In some systems, a subset of titles (by medium) for which copies are available is generated for use in selection, prior to check-out, so that only available copies are processed directly by the check-out routines. In other systems, a check is made of items from the Request File, to determine the availability of an appropriate title.

6.3 The system must make the needed number of assignments per borrower on the basis of priorities established by the Library.

There are two parts to this requirement: the number of books to be assigned and the order in which requests are processed at check-out.

6.3.1. Numbers of Books

The number of books that are to be assigned for check-out to borrowers is generally subject to some constraint: the maximum (or minimum) number of books that a borrower wants to have at any one time or the maximum number of books that the library allows a borrower to have at one time. These constraints can vary within a library by borrower or by service type. For example, with Turn-Around Service borrowers, the number of books to be sent at a given time matches the number of returned items, unless provision is made for some exception. For Calendar-Service borrowers, a minimum, a maximum, a fixed or a per-borrower variable number can be established and stored within the borrower's record. However, a limit in the number of books that a borrower can have at one time needs to be established for Calendar-Service borrowers, to ensure that some items are being returned while others are being mailed.

In many systems, options are provided for altering or overriding the standard procedures. For example, in the Colorado and Neoterics systems, the system user can specify, prior to the batch checkout run, the number of books an individual is to receive. In most systems that provide for interactive check-out, the system user has control over the number of books checked out to each borrower.

A major consideration in this requirement area is the need for the numbers of books to be associated with each of the media appropriate for a given borrower. For example, serious consideration needs to be given to whether the system will make a medium-for-medium replacement for Turn-Around Service borrowers.

Another consideration in this area is the need for the system to provide feedback to the library staff, interactively at the terminal or in the generation of a listing, to identify those borrowers who were not assigned the expected number of items. In some systems, this problem will automatically trigger the run of automatic selection; in others, a report is generated for staff review and followup action. In the Neoterics system, the listing that is produced includes: the borrower's name and ID; the number of books expected and the number actually assigned, per medium; and the reason expected service was not achieved (e.g., there were not a sufficient number of titles in the Request File, or the borrower had reached the established maximum).

6.3.2. Priorities in Processing

As discussed earlier in Part II of this Guide, there are a number of priority schemes used in the assignment of available copies to borrowers in automatic check-out. Some of the principles established in these systems are summarized below.

- In systems that accommodate "reserves," these are generally processed first, on a first-come, first-served basis, by borrower, for each title.

- In systems that draw upon a Request File at check-out time, these per-borrower orders are among the ones that are used:

  -- Service type order (e.g., Turn-Around Service borrowers first)

-- Alphabetical order

-- Borrower ID order

- In systems that draw upon a Request File at check-out time, but that also draw upon data in other files to derive a per-title order, the following orders are among the ones that are used:

  -- Titles that have been returned (checked in) but not yet re-shelved

  -- Titles that have the most number of available copies, in descending order

  -- First-come, first-serve basis (according to the date requested or selected)

In many systems, some combination of these or random-order approaches are taken.

6.4 The system must execute updates to the appropriate system files, to reflect changes in the status of data in the book inventory and borrower records.

Among the files in the system that will need to have some modification made to their records, on the basis of the check-out operations, are the ones identified below.

- Borrower's Has-Now File. The book number (or copy number) of the assignments and the date of the assignments will need to be added.

- Book Record. The number of copies checked out will need to be incremented and/or the number of copies available for check-out decremented. The number of times a copy of the book has been circulated (e.g., month-to-date and year-to-date statistics) will need to be incremented.

- Copy Record. If a copy record is maintained, the borrower ID and date of assignment will need to be added and the number of times the copy has been circulated will need to be incremented. The copy status will also need to be changed to "unavailable."

- Borrower's Has-Had File. If not handled later at check-in, the book number and date of assignment (optional) will need to be added to this file.

- Borrower's Request List. The book number and date of request for each assignment will need to be deleted.

For particular implementations that use various other working files, additional changes may be needed.

6.5 The system must produce cards, in an order to facilitate retrieval by library staff of items from the shelves, for use in mailings to and from borrowers.

In almost all systems, cards are printed for insertion into slots provided in the book containers. In a few systems, punched cards are produced and these are placed in window envelopes that are attached to the book containers.

For return mailings, a borrower simply reverses the card and places it back in the container. (A punched hole in one corner of the card is sometimes used to enable a blind individual to discern the side that carries the library address.)

The following list of elements identifies the basic set of mailing information produced by most systems and, as well, some additional elements (e.g., a transaction number; borrower status; date of assignment; and due date) that are included in one or more systems.

Borrower ID
Borrower Name
Borrower Address
Book (or Copy) Number
Container Number
Transaction Number
Date of Assignment
Due Date
Borrower Status
Library Name
Library Address
Notice: "Free Matter for the Blind or Handicapped"
Mechanism that enables blind individuals to determine which address is facing out when the card is inserted into container

Mailing cards are sorted and listed by book number. This order facilitates the identification and retrieval of items from the library's shelves. In those systems, e.g., DRA and Michigan, that support the re-distribution of materials from the mailing room, cards are produced in a sequence that matches the order in which books were checked in and placed on the mailroom shelves.

7.0 BOOK CHECK-IN

The check-in function involves a set of steps that are taken upon return of a checked-out book. These steps serve the following purposes: to relieve the borrower of responsibility for a book that has been returned; to record the fact that the book is available again for circulation, unless it has been damaged or is reported lost or stolen; and, for Turn-Around Service borrowers, to record the fact that the individual is due for service. In some systems, check-in also involves an update to the borrower's Has-Had record, so that the individual will not be sent the same book at a later time. (In other systems, this step is taken during check-out.)

The basic requirements for this function are outlined below. The check-in steps that are taken in one system are described in Exhibit 48 as an overview of this process.

7.1	The system must update records in files that are affected by the return of a book.
7.2	The system must record a temporary shelf order or the location of copies, to eliminate the need for re-shelving returned books prior to the next check-out.

This set of requirements covers the maintenance of various records and files in the system. The requirements do not address the means by which the library staff indicate to the system that a particular copy has been returned, because these requirements are highly specific to each implementation. The input procedures that have been designed for the existing systems include use of OCR equipment, online data entry, and coded (keypunched) cards.

Exhibit 48. Illustration of Check-In Steps

1. The Wisconsin System

1. The bar code on a returned book is read using a light pen. All returns for one day are stored for batch processing.

2. The next day a batch program executes the following updates:*

   - Decrements the number of books that the borrower has checked out. (If the number of books checked out to this borrower is fewer than a specified number, a book will be issued to this borrower during the next run of the check-out program.)
   - Removes the book number from the list of checked-out books for that borrower
   - Increments the number of times that the copy has circulated
   - Increments the number of available copies of that book
   - Changes the status of the returned copy to indicate that it is available for check-out (or not available if it is damaged, lost, or stolen)
   - Records the copy number in a temporary mailing-room shelf file (so that the book need not be re-shelved in the main shelving area if it is to be re-circulated immediately)

*The addition of a title to the borrower's Has-Had record is made at the time of check-out.

Exhibit 48. Illustration of Check-In Steps (Part 2)

2. The DRA System

The DRA check-in steps can be modified to conform to a particular library's procedures. However, the basic steps are as follows:

1. After entering the DISCHARGE (check-in) mode, the system user keys in the 3-digit number of the cart or shelf on which returned books will be temporarily shelved. (The system prompts for an indication of whether or not the cart/shelf is for damaged books, in which case the appropriate file updates will be executed during the run of the batch check-in program for items on that cart/shelf.)

2. The item numbers on returned book containers are then read, using OCR scanning equipment, and the containers are placed on the cart-shelf in the order in which they are scanned.

3. In addition to performing its standard check-in file maintenance operations, the system stores the item numbers of the returned book copies in the order in which the containers were scanned.

4. Later, after the Recharge Batch Stream (check-out) program has been executed, mailing cards for the checked-in items that have been reassigned to another borrower during check-out will be printed in the order in which the containers are arranged on the cart/shelf (i.e., the order in which they were scanned during check-in).

7.1 The system must update records in each file that is affected by the return of a book.

The files for which some status change is required at check-in are identified below.

The Has-Now and Has-Had Files

In most systems, the Has-Now and Has-Had records are maintained in separate files. At check-in, data on a title recorded in the Has-Now File are deleted and added to the Has-Had File. (As indicated earlier, these data are sometimes added to the Has-Had File as a part of the check-out function.)

In the Colorado system, these two files are combined. Check-in involves a simple code change in the affected title record: from C (for circulation) to H (for history). In those systems that update the Has-Had file at check-in, the book number and the date of check-in are the key elements added to the borrower's record. In the Alabama system, however, the date of check-in is not recorded. Instead, the date of check-out is transferred from the Has-Now file to the Has-Had file, and the system calculates the number of days the book was checked out. This number is recorded in the borrower's Has-Had record.

Book or Copy (Inventory) File

A returned book can generally be classified in one of four ways:

- It is available again for check-out (i.e., to be re-circulated)
- It is temporarily unavailable for check-out, due to the need for repair

- It is permanently unavailable for check-out, because it was lost, stolen, or damaged beyond repair
- The status is temporarily not known, e.g., a mailing card is received by the Library without the accompanying container.

In records maintained at the per-medium title level, one or more of the following changes will need to be made: decrement the number of copies checked out; increment the number of copies in repair; increment the number of copies available for check-out; take no action on returned copies for which the status is not known; decrement the number of copies owned for a given title, to reflect those lost, stolen, or otherwise not available; and increment the number of copies that have been stolen, lost, damaged, etc.

In systems that maintain copy-level data, the following changes will be needed: delete the borrower ID from the copy record; change the status of the copy to the appropriate indicator (e.g., available for check-out); and record the date of check-in.

Borrowers Due For Service File

The return of a book from a Turn-Around Service borrower should trigger some action in the system to indicate that the borrower is to receive another book--i.e., is due for service again. In a number of systems, a temporary file is generated of borrower IDs for those who are due for service. In other systems, where returned items are processed one at a time, in an online mode, the system user can serve that borrower immediately.

7.2 The system must record a temporary shelf order or the location of copies, to eliminate the need for re-shelving of returned books prior to the next check-out.

As was discussed earlier in Part II of this Guide, there is no universal agreement on the merits of providing for the immediate re-circulation of returned items, prior to their being re-shelved in the main collection area. However, in at least four systems--DRA, Michigan, Tennessee, and Wisconsin--some means for supporting this process is provided, as was illustrated earlier in Exhibit 48, in the description of the Wisconsin and DRA systems.

CHAPTER 9.

CONSIDERATIONS FOR DATABASE-RELATED OPERATIONS

In the following sections, we address requirements that are related to operations that must be performed on and from the stored data (the databases and files) that have been described earlier, in Chapter 7. In these sections, we cover the following requirement areas:

8.0	The system must give the system user access to data contained in the stored databases and/or files.
9.0	The system must provide for the display of information contained in the databases and/or files.
10.0	The system must provide for the creation of new records and the updating of existing records by the system user and the system for each of the databases and/or files in the system.
11.0	The system must provide for the generation of statistical reports and organized listings.

Requirements to cover the operations encompassed in these four areas need to be specifed in terms of those actions that are to be taken by the system user and those that are to be taken by the system, internally, in the execution of one or more of the functions outlined in Chapter 8. With certain exceptions, both of these aspects are covered in the following sets of requirements.

8.0 DATABASE ACCESS

> 8.0 The system must give the system user access to data contained in the stored databases and/or files.

The system itself must be able to draw upon data that are contained in its databases and working files (i.e., subsets of databases, organized and stored in pre-defined ways) in the execution of the various functions. However, the focus of the following discussion is on access to stored data by a staff member, as a "system user." The discussion is organized around those data elements that are typically defined as "access keys" or "search keys."

An access key is defined as the particular data element that is used by the staff member to request that the system locate and display a particular record or group of records. In some instances, an access key is a specially derived or constructed value, e.g., a combination of letters from the last and first names of an author.

While access to desired records in a file through the specification of a single parameter may suffice for a particular library's applications, it may be desirable to call for more sophisticated information retrieval techniques in a library's requirements. Information retrieval techniques provide users with Boolean operators (i.e., AND, OR, NOT) for specifying multiple parameters; intermediate system feedback to indicate the presence or absence, or the number of, records that satisfy the specified parameters in a request; and rapid searching, through the use of indexes of searchable terms. The distinction between these two approaches is illustrated in the following examples:

- Access to book titles is obtained by specifying a single parameter, e.g., the code 140 for the subject MYSTERIES. The resulting display is a list of titles that have been assigned this subject.

- Alternatively, access to book titles can be obtained by combining several parameters. For example, the user can retrieve all mysteries in disk format recorded by a non-accented female narrator through the entry of: MYSTERIES AND DISKS AND FEMALE AND NOT FOREIGN ACCENTS. The system responds with the number of records that satisfy the parameters of the search, and the system user then specifies that the records or some number of those records are to be displayed.

In most of the systems, single access keys are used with sequential (serial) searching of a specified file. In the Neoterics system, a system user can specify up to eight parameters, using the EQUALS, NOT EQUALS, GREATER THAN, and LESS THAN relational operators. The system scans the book or borrower database sequentially to locate records that have the specified characteristics. In the DRA system, the user selects from parameters within a set of pre-defined searches, as illustrated in Exhibit 49.

The access requirements discussed below are organized by each of the four major databases described earlier, in Chapter 7. In a particular system implementation, access may actually be to files that have been derived from one of these four databases.

8.0 DATABASE ACCESS

Exhibit 49. Illustration of DRA System Searching Capabilities, in the Illinois Application

```
   Illinois Library Services f/t Blind and    01/13/1981 Tue
     Physically Handicapped                   Picture:  MSLPRM -01
Function:  Manual Selection-Search            COLLECTION AGENCY:  IL1R
                                              AGENCY:  IL1R (312) 585-3192
PATRON:  ZUK**S01  [full name]

STAT SEX AGE     HAS   MAX    REQ    MIN   RSV   LANG      DATE
 A    M   80      30    30   11 12    15    0     E      10/15/1980

          REJECTS                LVL      CAN TAKE       HANDICAP
                                                 disk  leg bld  visual
YA
juv.                                     cassette   flop

SEARCH CRITERIA*
1. SUBJECT:                 120 Love stories (fiction)
2. SKIP IF HAS HAD:         Y
3. SKIP ALREADY REQUEST:    Y
4. SKIP IF REJECTED:        Y
5. SKIP WRONG MEDIA:        Y
6. SKIP NONE AVAILABLE:     N

Any change?
```

*Legend for Criteria:

SEARCH CRITERIA	MEANING	OPTIONS
SKIP IF HAS HAD	Skip any title on the borrower's has-had list.	Y/N
SKIP IF ALREADY REQUESTED	Skip any title already on borrower's request list.	Y/N
SKIP IF REJECTED	Skip any title that violates borrower's exclusion codes.	Y/N
SKIP IF WRONG MEDIUM	Skip any title that the library does not own in a medium acceptable to the borrower.	Y/N
SKIP IF NONE AVAILABLE	Skip any title for which there are no copies available in a medium acceptable to the borrower.	Y/N

8.1 The system must give the system user access to data contained in the Borrower database.

The system must provide the user with access to data in any of the seven groups of elements (records) on borrowers, which were described earlier in Section 1.0 of Chapter 7. The principal access keys for each group of borrower data are shown in Exhibit 50. The principal access key is the Borrower ID, a unique identifier for a given borrower.

If access is provided by a mnemonic borrower ID, an additional requirement is needed for truncation. Truncation provides for the entry of the stem of a value, to retrieve one or more values with the same stem but variant suffixes. For example, in the DRA system, the system user can enter JOHNSJ## and receive the following response:

1. JOHNSJ01 James Johns\123 Any Avenue 60108
2. JOHNSJ02 Jane Johnson\456 Some Street 62015
3. JOHNSJ03 John Johnston\789 Rural Road 61134

(etc.)

Exhibit 50. Major Access Keys to Borrower Data

Requirement	File	Access Key(s)	Implementation Notes
8.1.1	General Borrower Data	Borrower ID Name Name and Zipcode	Alabama provides access by name and by name and zip code, which can be truncated. A name-truncation capability is being added.
8.1.2	Service Profile	Borrower ID	Service Profile information is usually stored with General Borrower Data; access is the same as for General Borrower Data.
8.1.3	Requests and Reserves	Borrower ID (Book ID)	In most systems, access to borrower requests and reserves is provided by Borrower ID, even though these data are stored in a file organized by book ID in some systems. In one of the nine systems that handle reserves, access is provided only by Book ID.
8.1.4	Has-Now Information	Borrower ID (Machine ID)	The DRA and Pennsylvania systems provide access by Machine ID to information on machines that a borrower has.
8.1.5	Has-Had Information	Borrower ID	
8.1.6	Magazine Subscription Information	Borrower ID	In the DRA system, access to a particular magazine subscription record for a borrower involves entry of the Borrower ID, followed by entry of the Magazine Code.

8.2	The system must give the system user access to data contained in the Book database.

The system must provide the system user with access to data in any of the four groups of elements (records) on books, which were described earlier in Section 2.0 of Chapter 7. The most commonly provided access keys for book data are shown in Exhibit 51. The principal access key is the Book Number.

In addition, consideration needs to be given to the possible need for additional access through the following data elements: Author, Title, Narrator, and Subject. Examples of the use of two of these data elements are provided below.

- Author. In the DRA and Massachusetts systems, an Author access key is derived from a specified number of characters taken from the last, first and middle initials. For example:

  In the DRA System: William Shakespeare is SHAKEW
  In the MA System: Harriet Beecher Stowe is STOWHB

- Title. Title access keys are generally derived from a specified number of characters from a specified number of words in a title, excluding leading articles, such as a, the, an. For example, Gone With The Wind can be retrieved in the DRA and Massachusetts systems as with the title access keys shown below.

  In the DRA System: GON,WIT,THE,WIN
  In the MA System: GONWIT

  In the DRA system, the system user can enter fewer characters than those specified in the search key.

Exhibit 51. Major Access Keys to Book Data

Requirement Number	File	Access Keys	Implementation Notes
8.2.1	General Title Data	Book number Author access key Title access key Subject code	- Wisconsin plans to provide for a combined author-title access key. - Subject code access provides limited book information (e.g., title and book number) in some systems.
8.2.2	Title Data Per Medium (Descriptive Information)	Book number Author access key Title access key Subject code Narrator access key	In most systems, Descriptive Title Data Per Medium elements are stored with General Title Data. Therefore, the access keys are the same as outlined above. - - In the Tennessee system, access is provided by narrator name.
	Title Data Per Medium (Inventory Information)	Book number	In most systems, Inventory Information is stored with General Title Data and Descriptive Title Data Per Medium; Therefore, access is the same as outlined above. However, for the retrieval of Inventory Information, the most common access element is the book number. (In the DRA system, inventory information is kept in a "holdings file" accessible only by book number.)
	Title Data Per Medium (Request/ Reserve Data)	Book number	Only two systems provide access to request information by book number. (Two others include the number of requests as an element of data in the display of Descriptive Title Data Per Medium.) Most systems provide access to reserve data by book number.
8.2.3	Per-Copy Data	Copy number Book number	DRA provides for direct access to copy data by copy number. Retrieval of copy data in the Wisconsin system requires retrieval of the book record (by book number) first. (Copy records can then be scanned.)

Requirements for access keys need to specify whether they are to be derived automatically by the system and stored as separate elements; generated by the system user when a new book record is created and stored in the system as a separate data element; or entered by the system user and used by the system in locating records, even though the key is not stored. A study of the alternatives available in this area involves considerations of ease of use of the system versus storage and system programming complexities.

Access to per-copy information in a book file can be through the book number, as it is done in the Wisconsin system, or through the copy number, as it is done in the DRA system, which provides a display of copy numbers that are associated with any given book number.

8.3 The system must give the system user access to data contained in the Magazine Database.

The system must provide the system user with access to data in any of the elements that were described earlier in Section 3.0 of Chapter 7.

In most implementations, magazine data are stored at the per-medium level, so that the group of general title data elements, although the same among various media, are stored in a record for each medium in which the title is available. The primary element for accessing these records is a unique Magazine Issue ID. Examples of such IDs are given below in Exhibit 52.

Exhibit 52. Examples of Unique Magazine Issue IDs

(1) The Alabama System

5ABC012

- 5 — Medium indicator
- A — Title code
- B — Last digit of publication year
- C — Publication month

(2) The DRA System

(a) Magazine Issue ID

[ABC4012

- [— Magazine indicator
- ABC — Title code
- 4 — Medium indicator
- 012 — Issue indicator

(b) Copy Number

60211345P (sequentially-assigned accession number)

Access to per-copy information is also provided in the DRA system. It is by the copy number, an example of which was provided earlier in Exhibit 52. A display of copy numbers associated with particular magazine issues can be generated by entering the appropriate Magazine Issue ID.

8.4 The system must give the system user access to data contained in the Equipment database.

The system must provide the system user with access to data in any of the two groups (records) of elements on equipment that were described earlier in Section 4.0 of Chapter 7. The principal access keys for equipment data are presented below in Exhibit 53.

As indicated in Section 4.0, there are two types of equipment: machines and accessories. In most implementations, access to data on machines is by a machine number, which usually consists of the model number coupled with a serial number that identifies a specific unit of that model, or by the model number. (In at least six systems, a display of the borrower record includes the machine number of any machine checked out to that borrower.) Access to information on accessories is through an accessory code.

Exhibit 53. Major Access Keys to Equipment Data

Requirement	File	Access Key(s)	Implementation Notes
8.4.1	Per Model Data	Model number	--
8.4.2	Per Unit Data	Model number Machine number	Systems that store together per-unit information and per-model data provide access through the model number. In other systems, per-unit data are accessible through the machine number.
8.4.3	Accessory Data	Accessory code (Borrower ID)	If stored in the system, inventory data are accessible through the accessory code. Data on those borrowers who have accessories are accessible only through the Borrower ID, in the Borrower Database.
8.4.4	Request Data	Model number and Agency Borrower ID	These data are available only on the DRA system.

9.0 DISPLAY OF DATA

> 9.0 The system must provide for the display of information contained in the databases and/or files.

Once the appropriate records have been identified, their contents must be presented to the system user. Display is used here to mean presentation on CRT terminal screens of information from any of the databases or files. In 12 of the 13 systems, staff are allowed to view data online, and this capability is being implemented in the other system.

The presentation of data on a CRT screen varies considerably from system to system. A few examples are shown in Exhibit 54. Some of the factors to be considered in establishing requirements for screen displays are:

- Who is likely to be viewing the display, e.g., a trained system operator who uses the system regularly or staff members who use the system only on occasion, and for what purposes?
- What volume of information needs to be presented on the screen at one time?
- How should data elements be formatted for easy viewing?
- Are labels of data elements required and/or are coded (e.g, a 1 or an A) data comprehensible to the average system user?

These system requirements need to be established in context of specific functions, e.g., in the modification of a borrower or book record, or in the viewing of a borrower's Has-Now record.

While it is not possible in this Guide to discuss in detail all of these and other considerations, as well, the handling of displays for high volumes of information contained in a given record is particularly worthy of comment.

9.0 DISPLAY OF DATA

The display of a record can sometimes require more than one screen. For example, in the DRA system, a display of borrower data requires four screens. There are important differences in the way in which different volumes of information are displayed. Two major approaches are used among the various implementations, to reduce the time that is needed for a system user to obtain a display of particular data elements with a record.

Screen Selection. The system user specifies the particular screen of a multi-screen record that is to be displayed. If, for example, a borrower's subject interests are to be displayed, the request is made to view "screen three" of the borrower record, which is known by the system user to contain this element.

Field Selection. The system user specifies a field or a range of fields that are to be displayed. In the Pennsylvania system, for example, each field in a record carries a unique number. A selection of fields 2-12 of the borrower record for John Smith displays the following elements:

2-3	Borrower, institution name
4	Institution code
5-8	Address
9	County code
10	Telephone number
11	Birthdate
12	Service start date

Sorting is another method that is used to facilitate the location of desired information within a record or set of records. Sorting arranges a set of items in a specified order, e.g., by date or by ID number. The system user can take advantage of the ordered arrangement to advance to the screen that contains the desired information. For example, if a borrower's request list is arranged in book number order, the system user can quickly scan the list to determine if the borrower has requested a particular title. This type of

9.0 DISPLAY OF DATA

"scanning" is generally acceptable to system users only at higher baud rates--a minimum of 1200 baud (120 characters per second) and, preferably, 9600 baud. Sorting orders are almost always specified in advance, and data are stored in that order.

Exhibit 54. Sample Display Screens

1. The DRA System (from the Illinois Application)

```
Illinois Library Services f/t Blind and Physically Handicapped          0/13/1981 Tue
Function:  Patron Maintenance Inquire                                   Picture:  PATMNT-0

Patron profile for [full name] Patid:  ABERNJ01  Patnum:  911

1. Birthdate     01/01/1853    7.  Languages      E                13.  Hearing    N
2. 1st served    01/18/1978    8.  Telephone      (312) 000-0000   14.  Vis hand   N
3. Last notice   11/03/1980    9.  Student        N                15.  Lg blind   N
4. Sex           M             10.  Juvenile      N                16.  Learning   N
5. Status        T             11.  Reading Lvl                    17.  Mental     N
6. Advisor                     12.  Veteran       N                18.  Physical   N

19.  Certified by

Reject any book with:

20.  Violence          N       24.  Short book        N       28.  Male reader      N
21.  Sex               N       25.  Adult book        N       29.  Female reader    N
22.  Strong Language   N       26.  Young adult book  Y       30.  Accented reader  N
23.  Long book         N       27.  Juvenile book     Y

Which screen?
```

Exhibit 54. Sample Display Screens (Part 2)

2. The Wisconsin System

```
                    WISCONSIN REGIONAL LIBRARY
                FOR THE BLIND AND PHYSICALLY HANDICAPPED
                        SCAN REGISTRATION FILE
ACTION: '___' (SEE BELOW)
                                              1. BORROWER NUMBER   '_______'
2.  TITLE '____' (MS,MISS,MRS,MR/MRS,MR,DR,SR,REV,BR,FR)
          (FIRST)   (I)   (LAST)
3.  NAME  '_________' '_' '___________'   OR   '________________________'
3A. EXTRA ADDRESS LINE '________________________'
4.  STREET ADDRESS     '________________________'
5.  CITY               '_________________'     6. COUNTY '__'  (LOCAL)  (EXT)
7.  ZIP                '_____'                 8. PHONE '___' '_______' '____'
                                    MMDDYY      SUBREGIONAL PATRON  '_' (S,T,R)
9.  SEX '_' (M,F,B)  10.  BIRTHDATE '______'   11. BORROWER TYPE    '_'
                                                   (A,J,N,H,S,L,R,Y,E,D,T,G,B,O)
12. LOCAL LIBRARY      '_________________'     13. LIBRARY SYSTEM    '__'
14. VISUAL HANDICAP    '_' (Y,N)               15. PHYSICAL HANDICAP '_' (Y,N)
16. EDUCATION LEVEL    '_' (G,H,C,O)           17. JOB BACKGROUND    '___'
VETERAN      '_' (Y,N)
HEARING LOSS '_' (N,M,P,D)  MMDDYY      *ACTION*  *DESCRIPTION*
22. DATE OF REGISTRATION '______'         NULL      CONTINUE TO SERVICE
                                          BPH       RETURN TO BPH MENU
                                          RET       RETURN TO SYSTEM MENU
```

10.0 CREATION OF NEW RECORDS AND UPDATING

> 10.0 The system must provide for the creation of new records and the updating of existing records by library staff and the system for each of the databases in the system.

The system must permit staff members to add and delete records and to modify existing records in each of the four databases that were described earlier in Chapter 7. Proper database maintenance ensures that data in the system are as accurate and up-to-date as possible.

These databases are maintained by two sources: library staff and the system. In general, the system performs its maintenance operations during execution of selection, check-out, and check-in. Implicit in the set of requirements in this area, however, is the need for staff to be able to access and maintain almost all data elements in the databases. During the process of converting from a manual to an automated system, library staff are typically responsible for data entry, although a system should be able to support the generation of databases from data already in computer-readable form. Thereafter, when errors are detected in the databases, the staff must be able to delete or modify erroneous data. Finally, as borrowers initiate, terminate, or otherwise alter their service and items are added and removed from circulation, staff must be able to make the appropriate additions, deletions, and modifications. The requirement that authorized staff be able to take whatever actions are needed to maintain the integrity of the databases and effectiveness of the operations may lead, as well, to another requirement for security provisions. Such security measures, through special IDs or passwords, may be required to limit system access to certain staff members who are solely responsible for a certain set of functions.

11.0 STATISTICAL REPORTS AND ORGANIZED LISTINGS

11.0	The system must provide for the generation of statistical reports and organized listings.

Requirements to cover these database output products must be specified in terms of a Library's reporting obligations and its needs for management information and paper-copy reference tools. The NLS/BPH reporting requirements for network libraries are well established, but state and local requirements vary. Therefore, the requirements in 11.2 can be discussed only at a general level.

11.1	The system must produce NLS/BPH-required reports on borrowers, book and magazine circulations, and (as appropriate) equipment.
11.2	The system must permit the library to obtain organized (i.e., sorted and formatted) management and reference listings (offline, on a line printer or printer terminal) of data that are stored in one or more databases or files.

11.1 The system must produce NLS/BPH-required reports on borrowers, book and magazine circulation, and (as appropriate) equipment.

To produce the NLS/BPH reports, a system must be able to locate relevant data stored in various databases and compute statistics from those data. In planning for this requirement area, library staff must weigh a number of trade-off issues: whether it is better to store statistics (e.g., cumulative counts) or to have the system compute the needed statistics at report generation time; and, if statistics are to be stored, whether it is better to have the counts generated for storage at the time of check-out and check-in (thereby adding to the processing time of those functions) or to have them made only periodically.

Although an individual library may have a requirement for being able to view certain statistics online, at the terminal, the basic assumption underlying this and the following discussion is that the reports or listings will be generated offline, in a batch mode.

The borrower report that is completed by all NLS/BPH libraries is given in Exhibit 55. NLS/BPH asks for the total number of borrowers (in the section on ACTIVE INDIVIDUAL READERS and ACTIVE DEPOSIT COLLECTIONS) and the total number of borrowers in each medium (READERSHIP). The active number of Readers and Deposit Collections cannot be derived from the Readership data, because the Readership data are likely to contain some double counts. Borrowers will be counted more than once in Readership if they are active and receive materials in more than one medium.

Exhibit 55. NLS/BPH Borrower and Circulation Reports

1. Borrower Report

LIBRARY OF CONGRESS
NATIONAL LIBRARY SERVICE FOR THE BLIND AND PHYSICALLY HANDICAPPED

LIBRARY REPORTING:
☐ Regional Library _____
State served (Use separate form for each state _____

☐ Subregional Library _____
(Submit report to the regional library for your area)

FISCAL YEAR _____ PERIOD REPORTED: ☐ Oct. 1 - March 31 (6 months) ☐ Oct. 1 - Sept. 30 (12 months)

ACTIVE INDIVIDUAL READERS	TOTAL
Adults	
Juveniles	
TOTAL	

ACTIVE DEPOSIT COLLECTIONS	TOTAL
Libraries (not subregional)	
Schools for the blind and physically handicapped	
Public and private schools (elementary and secondary only)	
Hospitals	
Nursing homes and convalescent homes	
Other (specify)	
TOTAL	

READERSHIP

FORMAT	INDIVIDUAL USERS	DEPOSIT COLLECTIONS
Recorded Disc Containers		
Recorded Cassette Containers		
Open-Reel Containers		
Braille Volumes		
Large Type Volumes		
Other (specify)		

(See other side of this form for explanatory notes)

Exhibit 55. NLS/BPH Borrower and Circulation Reports (Part 2)

2. Circulation Report

LIBRARY OF CONGRESS
NATIONAL LIBRARY SERVICE FOR THE BLIND AND PHYSICALLY HANDICAPPED

LIBRARY REPORTING:

☐ Regional Library _____
State served (Use separate form for each state) _____

☐ Subregional Library _____
(Submit report to the regional library for your area)

FISCAL YEAR _____ PERIOD REPORTED: ☐ Oct. 1 - March 31 (6 months) ☐ Oct. 1 - Sept. 30 (12 months)

CIRCULATION

FORMAT	INDIVIDUAL READERS	DEPOSIT COLLECTIONS	INTER-LIBRARY LOAN	TOTAL
Recorded Disc Containers				
Recorded Cassette Containers				
Open-Reel Containers				
Braille Volumes				
Large Type Volumes				
Other (specify)				

The individual borrower data on Adults and Juveniles are generally produced from data contained in the borrower database, from a borrower type code or from birth dates. The per-medium borrower data are determined in a number of different ways. For example, some systems count those borrowers with non-zero values in an "items-received-to-date" field (1.2.13); others count borrowers for whom the date of last service (1.2.12) falls within the current reporting period.

The NLS/BPH circulation report is also provided in Exhibit 55. Again, to produce these data, a number of different approaches are used, depending upon whether the data are already stored or must be computed. In some systems, the number of items received in each medium, are recorded on a cumulative basis (e.g., month-to-date and year-to-date) in the borrower database. In other systems, the "number-of-times-circulated" fields in the book records or copy records in the book database are used to provide these data. In the Cincinnati system, a separate file for statistics is maintained and updated during the check-out function. A sample of statistical data compiled in this system is provided in Exhibit 56.

To produce data for one of the NLS/BPH-required reports on equipment (see Exhibit 57), the system must record the status of each piece of equipment and the date of change in that status. In the two systems that are currently producing equipment reports, the Libraries are producing a number of the equipment reports manually (e.g., the Monthly Inventory of Machine Transfers) because some of the data are not maintained in the equipment database.

Exhibit 56. Data Maintained in Cincinnati System's Statistical File

Name: STATIST Length: 64 Key: Statistical key (STKEY pos 1

NAME	SIZE	TYPE	DESCRIPTION
STKEY	3	A	Statistical key for type of media: (N) TB = Talking Book TBM = Talking Book Magazine CB = Cassette Book CBM = Cassette Book Magazine BR = Braille BRM = Braille Magazine MT = Magnetic Tape
ICNTM	3	P	Number of titles circulated to individuals for the month (O)
IEXTM	3	P	Number of extra titles per container circulated to individuals for the month
ICONM	3	P	Number of containers circulated to individuals for the month
DCNTM	3	P	Number of titles circulated to deposits for the month
DEXTM	3	P	Number of extra titles per container circulated to deposits for the month
DCONM	3	P	Number of containers circulated to deposits for the month
ICNT1	3	P	Number of titles circulated to individuals for the first quarter (Jan-Mar)
IEXT1	3	P	Number of extra titles per container circulated to individuals for the first quarter
ICON1	3	P	Number of containers circulated to individuals for the first quarter
DCNT1	3	P	Number of titles circulated to deposits for the first quarter
DEXT1	3	P	Number of extra titles circulated to deposits for the first quarter
DCON1	3	P	Number of containers circulated to deposits for the first quarter
ICNT2	3	P	Number of titles circulated to individuals for the second quarter (Apr-Jun)
IEXT2	3	P	Number of extra titles circulated to individuals for the second quarter
ICON2	3	P	Number of containers circulated to individuals for the second quarter
DCNT2	3	P	Number of titles circulated to deposits for the second quarter
DEXT2	3	P	Number of extra titles per container circulated to deposits for the second quarter
DCON2	3	P	Number of containers circulated to deposits for the second quarter
ICNT3	3	P	Number of titles circulated to individuals for the third quarter (Jul-Sep)
IEXT3	3	P	Number of extra titles per container circulated to individuals for the third quarter
ICON3	3	P	Number of containers circulated to individuals for the third quarter
DCNT3	3	P	Number of titles circulated to deposits for the third quarter
DEXT3	3	P	Number of extra titles per container circulated to deposits for the third quarter
DCON3	3	P	Number of containers circulated to deposits for the third quarter
ICNT4	3	P	Number of titles circulated to individuals for the fourth quarter (Oct-Dec)
IEXT4	3	P	Number of extra titles per container circulated to individuals for the fourth quarter
ICON4	3	P	Number of containers circulated to individuals for the fourth quarter
DCNT4	3	P	Number of titles circulated to deposits for the fourth quarter
DEXT4	3	P	Number of extra titles per container circulated to deposits for the fourth quarter
DCON4	3	P	Number of containers circulated to deposits for the fourth quarter

Exhibit 57. Sample Page from NLS/BPH Equipment Report

National Library Service
for the Blind and Physically Handicapped

SEMIANNUAL MACHINE STATUS REPORT

MONTH _____

YEAR _____

AGENCY I.D. CODE _____

ADDRESS

Library of Congress
National Library Service for the Blind and Physically Handicapped
Equipment Control Officer
Washington, D C 20542

INSTRUCTIONS Form must be completed by the last day of March and September and returned to the address indicated at left.

2/ QUANTITY RECEIVED	MODEL NUMBER	1/ AVAILABLE FOR ASSIGNMENT	1/ ALL MACHINES ASSIGNED	1/ IN REPAIR	2/ DAMAGED BEYOND REPAIR	2/ LOCATION UNKNOWN	2/ STOLEN	2/ LOST IN MAIL	3/ TOTAL	2/ SEMIANNUAL TRANSFERS		2/ MACHINES ASSIGNED DURING 6 MOS.	
										IN	OUT	REASSIGNED	NEW
TALKING BOOK MACHINES													
	A79												
	A78												
	A77												
	A76												
	A75												
	A74												
	A73												
	A72												
	A71												
	TOTALS												
CASSETTE MACHINES													
	C79												
	C78												
	C77												
	C76												
	C76A 4/												
	C74												
	TOTALS												
ACCESSORIES													
	Ear-Phones												
	Pillow Speakers												
	Remote Controls												

1/ Entries indicate current status of all machines as of last day of reporting period.
2/ Entries contain totals since the last semiannual report.
3/ Sum of all columns from "available for assignment" to "lost in mail"
4/ Represents all new machines received by MLA (including those for subletting agencies), should not be limited only to machines received during this six month reporting period.
5/ Overseas machines NLS only

73 162a (rev 2/80)

11.2	The system must permit the library to obtain organized (i.e., sorted and/or formatted) management and reference listings (offline, on a line printer or printer terminal) of data that are stored in one or more files.

Report generation capabilities can be contrasted in the description of several approaches provided below.

- The system has pre-defined reports that cover particular sets of data and particular formats. The system user requests a report by specifying its name or code.

- The system has pre-defined report formats, but the user can specify the data to be included. Formats include tables in which the system arranges the user's specified data across the page and adds the appropriate column headings, and listings in which the system arranges the user's specified data down a page and adds the appropriate row labels.

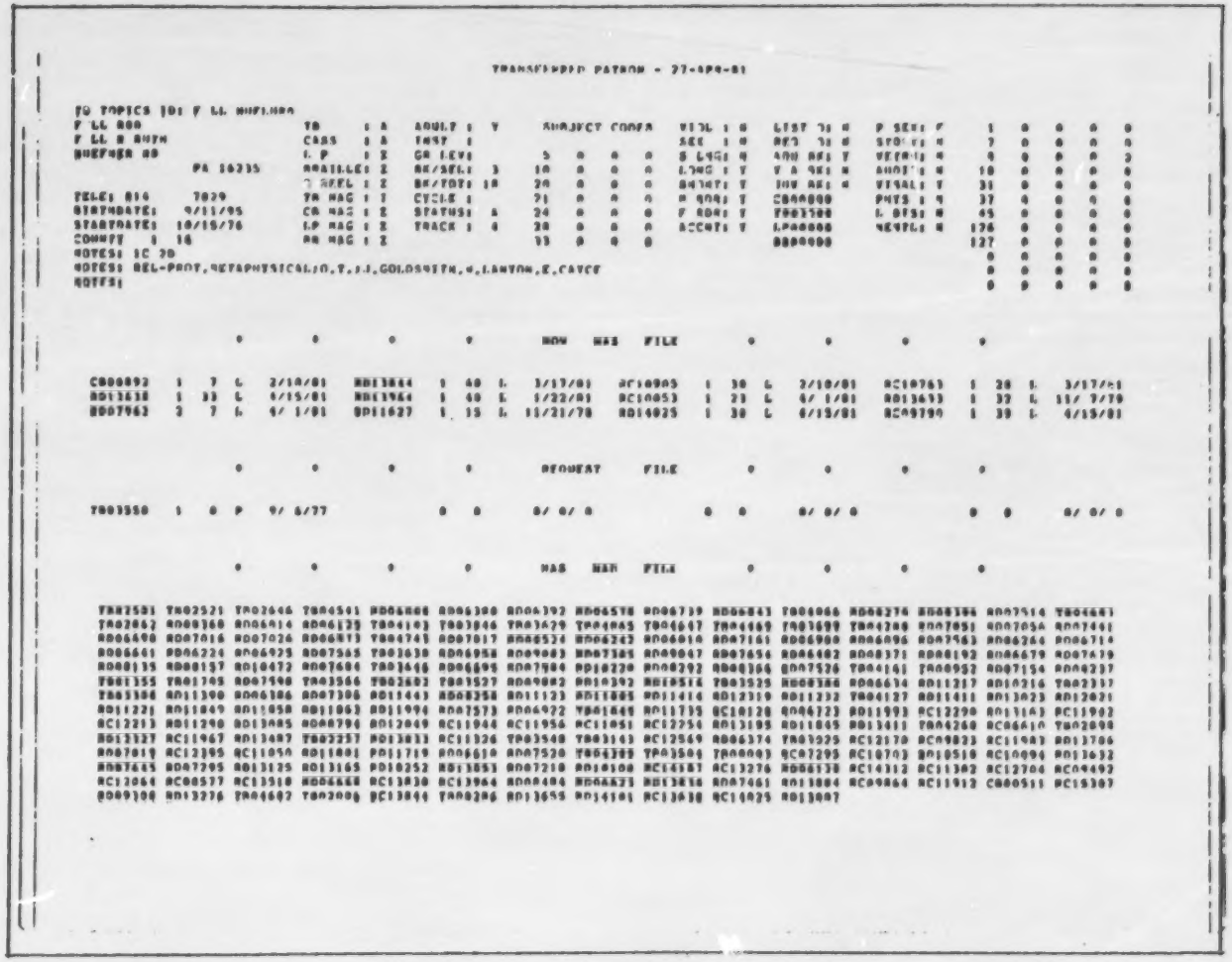
- The system is flexible and permits the system user to specify both the content and the format of the desired report.

A less flexible report generator will be acceptable if the library staff is able to define well, in advance, their needs for various management and reference-support data.

The types of listings and reports produced by the various systems serve a wide range of reference and management purposes. In some libraries, staff rely heavily on reference listings that contain basic borrower data. Exhibit 58 illustrates the format of borrower record listings produced by

the Pennsylvania system. Inventory reports on holdings and circulation are also important tools for use in managing resources and controlling collection development. Exhibit 59 contains a sample of a holdings report produced by the Florida system. This report, which contains book number, title, author, circulation and inventory data, and number of pending (unfilled) requests, is consulted monthly to identify those books for which extra copies must be produced to serve pending requests. This type of report can also be used to support weeding, the process of clearing unused copies and titles from library shelves.

Exhibit 58. Borrower Record Listings from the Pennsylvania System



TRANSFERRED PATRON - 27-APR-81

TO TOPICS]DI F LL HNFLHRA

F LL ROO TB : A ADULT : Y SUBJECT CODES VISL : 0 LIST]1 : 0 P SER: F 1 0 0 0 0 0
F LL R RNTH CARS : A TEST : SEE : 0 REF]1 : 0 STOR: N 2 0 0 0 0 0
BUFFER RR L P : I GR LEV: 5 0 0 0 S LOG: N ADU RE: Y VERB: N 9 0 0 0 0 0
PA 16235 AVAILLE: I RR/SEL: 3 10 0 0 0 LOG : Y V A SE: N AUDI: N 10 0 0 0 0 0
] SEEL : I RR/TOT: 10 20 0 0 0 RETURN: Y JUV RE: N VISAL: Y 31 0 0 0 0 0
TELE: 814 7029 TR MAG : I CYCLE : 21 0 0 0 M SUBJ: Y CBRRROO PHTS : Y 37 0 0 0 0 0
STRTMDATE: 9/11/95 CR MAG : I STATUS: A 24 0 0 0 F SUBJ: Y TRRIJOO L DESC: N 45 0 0 0 0 0
STARTDATE: 10/15/76 LP MAG : I TRACK : 4 28 0 0 0 ACCNTS: Y LPRRRRR VERIFI: N 176 0 0 0 0 0
COMMTT 0 16 RR MAG : I 33 0 0 0 RRRRRRR 127 0 0 0 0 0
NOTES: IC 20 0 0 0 0 0
NOTES: REL-PROF,METAPHYSICAL,JO,T,J.J,GOLDSMITH,G,LANYON,E,CAYCE 0 0 0 0 0
NOTES: 0 0 0 0 0

								NOW	MAX	FILE													
CBRRRR2	1	7	L	2/10/81	RBE3R44	1	40	L	3/17/81	RC10905	1	30	L	2/10/81	RC10763	1	28	L	3/17/81				
RD13E3R	1	33	L	4/15/81	RBE1964	1	40	L	1/22/81	RC10053	1	23	L	4/ 1/81	RD13633	1	32	L	11/ 7/79				
R007962	2	7	L	4/ 1/81	RD11627	1	15	L	11/21/78	RD14025	1	30	L	4/15/81	RC09790	1	30	L	4/15/81				
								REQUEST		FILE													
T9031550	1	0	P	9/ 6/77		0	0		0/ 0/ 0		0	0		0/ 0/ 0		0	0		0/ 0/ 0				
								HAS	HAR	FILE													

TR02581 TR02521 TR02646 TR06501 RD06R08 RD06300 RD06392 RD06578 RD06739 RD06843 TR04066 RD08276 RD08386 RD07514 TR04681
TR02862 RD08360 RD06916 RD06125 TR04103 TR03846 TR03629 TR04985 TR04607 TR04469 TR03699 TR04288 RD07051 RD07054 RD07491
RD06490 RD07016 RD07026 RD06R13 TR04745 RD07017 RD08524 RD06243 RD06010 RD07161 RD06900 RD06096 RD07563 RD06264 RD06714
RD06661 RD06224 RD06925 RD07565 TR03638 RD06958 RD09083 RD07385 RD09047 RD07656 RD06482 RD08371 RD08192 RD06679 RD07439
RD08135 RD08157 RD10472 RD07606 TR03648 RD06895 RD07984 RD10220 RD08292 RD08366 RD07526 TR04141 TR00952 RD07154 RD08237
TR01355 TR01705 RD07598 TR03566 TR02602 TR03527 RD09082 RD10392 RBE9514 TR03525 RD08386 RD06634 RD11217 RD10216 TR02337
TR03386 RD11390 RD06106 RD07306 RD11443 RD08258 RD11123 RD11805 RD11414 RD12319 RD11232 TR04127 RD11411 RD13023 RD12021
RD11221 RD11849 RD11958 RD11863 RD11994 RD07573 RD06922 TR01845 RD11735 RC10128 RD06723 RD11993 RC12290 RD13143 RC11902
RC12213 RD11290 RD13485 RD08796 RD12049 RC11944 RC11956 RC11051 RC12256 RD13195 RD11865 RD13411 TR04260 RC06410 TR02898
RD13327 RC11967 RD13487 TR02257 RD13833 RC11326 TR03548 TR03143 RC12569 RD06374 TR03525 RC12170 RC09823 RC11983 RD13706
RD07019 RC12395 RC11958 RD11801 RD11719 RD06610 RD07520 TR04288 TR03504 TR00003 RC07295 RC10703 RD10510 RC10096 RD13632
RD07445 RD07295 RD13125 RD13165 RD10252 RD13851 RD07210 RD10100 RC14187 RC13276 RD06138 RC14312 RC11302 RC12704 RC09492
RC13064 RC08577 RC13518 RD06568 RC13830 RC13964 RD08484 RD06471 RBE3E56 RD07461 RD13804 RC09864 RC11912 C000511 RC15307
RD09308 RD13276 TR04607 TR02008 RC13844 TR00286 RD13655 RD14101 RC13838 RC14025 RD13007

Exhibit 59. Sample Holdings Listing from the Florida System

BKLSTS

JANUARY 16, 1981

BIBLIOGRAPHY
BY PENDING

PAGE 1

BOOK NUMBER	TITLE	AUTHOR	CIRCULATION MTD	CIRCULATION YTD	COPIES	VOLS	PEND'G	AVAIL	MS	NOTES
100383	MIRROR CRACK'D FROM SIDE TO SIDE	CHRISTIE, AGATHA MILLER	1	2	5	1	284	1		
100535	WITNESS FOR THE PROSECUTION, AND...	CHRISTIE, AGATHA MILLER	4	8	7	1	285			NO AVAIL
100647	CASE OF THE PHANTOM FORTUNE, THE	GARDNER, ERLE STANLEY	2	4	5	1	266			NO AVAIL
100815	CASE OF THE DARING DIVORCEE, THE	GARDNER, ERLE STANLEY	2	7	5	1	254			NO AVAIL
101004	SURPRISE SURPRISE, A COLLECTION...	CHRISTIE, AGATHA MILLER		4	8	1	282	1		
103566	TWELVE, THE STORY CHRIST'S APOST...	GOODSPEED, EDGAR JOHNSON		5	8	1	284	1		
104125	DAY OF THE JACKAL, THE	FORSYTH, FREDERICK	1	2	4	1	258			NO AVAIL
104726	CAPTAINS AND THE KINGS	CALDWELL, TAYLOR	3	6	6	1	262			NO AVAIL
106010	WOMAN AT THE WELL, THE	ROGERS, DALE EVANS	3	13	39	1	309			NO AVAIL
106096	ALL CREATURES GREAT AND SMALL	HERRIOT, JAMES	21	52	62	1	337	2		
106467	AT WIT'S END	DOMBECK, ENMA	1	4	11	1	458			NO AVAIL
106611	LIFE OF CHRIST, THE	ALLEN, CHARLES L.	4	13	15	1	419	1		
106621	GREAT CHAPTERS OF THE BIBLE	MORGAN, GEORGE CAMPBELL	1	2	35	1	510			NO AVAIL
106623	JOLSON	FREEDLAND, MICHAEL	16	26	24	1	279	1		
106634	ESTHER	LOFTS, NORAH ROBINSON		7	7	1	296			NO AVAIL
106651	TAKE MY WIFE...PLEASE	YOUNGMAN, HENNY	1	4	9	1	401			NO AVAIL
106675	ONCE IS NOT ENOUGH	SUSANN, JACQUELINE	3	6	9	1	267			NO AVAIL
106786	LIFE WITH MOTHER	DAY, CLARENCE	22	46	37	1	287	1		
106797	BEST SHORT STORIES, THE	O. HENRY	8	26	36	1	407	1		
106805	MAN CALLED PETER, A	MARSHALL, CATHERINE	2	12	15	1	295			NO AVAIL
106974	BURR, A NOVEL	VIDAL, GORE	2	7	9	1	340	1		
106985	BUT I WOULDN'T HAVE MISSED IT...	BRACKEN, PEG	4	12	12	1	274			NO AVAIL
107007	ALL UNDER HEAVEN	BUCK, PEARL S.	1	2	3	1	292			NO AVAIL
107047	STORY OF THE TRAPP FAMILY SINGERS	TRAPP, MARIA AUGUSTA	36	88	87	1	376	3		
107063	EGG AND I, THE	MACDONALD, BETTY BARD	2	7	13	1	302	2		
107076	CHRISTY	MARSHALL, CATHERINE WOOD	8	31	58	1	364	2		
107090	IN ONE ERA AND OUT THE OTHER	LEVENSON, SAMUEL	2	13	13	1	415	1		
107099	I BELIEVE IN MIRACLES	KUHLMAN, KATHRYN	2	9	20	1	295			NO AVAIL
107222	GANG THAT COULDN'T SHOOT STRAIGHT	BRESLIN, JIMMY	12	22	25	1	250	1		
107387	ALL THINGS BRIGHT AND BEAUTIFUL	HERRIOT, JAMES	7	26	42	1	452			NO AVAIL
107481	CENTENNIAL	MICHENER, JAMES A.	6	20	23	2	391	2		
107544	HOMECOMING, THE	HANNEH, EARL	6	19	20	1	271	1		
107688	PLAIN SPEAKING-ORAL BIOG-H S TRUMAN	MILLER, MERLE	9	21	30	1	301	1		
107618	KEYS OF THE KINGDOM, THE	CRONIN, ARCHIBALD JOSEPH	4	6	4	1	381			NO AVAIL
107625	AVA, A LIFE STORY	HIGHAM, CHARLES	2	3	2	1	287			NO AVAIL
107630	SCREWING OF THE AVERAGE MAN, THE	HARGOOD, DAVID	2	3	6	1	301			NO AVAIL
107684	BOOK YOU ALWAYS MEANT TO READ, O.T.	3RD, MARGUERITTE HARMON	2	6	29	1	252	1		
107960	GRANDMOTHER AND THE PRIESTS	CALDWELL, TAYLOR	1	2	8	1	350			NO AVAIL
107975	ACTOR-THE LIFE & TIMES OF PAUL MUNI	LAWRENCE, JEROME	9	9	9	1	255			NO AVAIL
107980	SOME ARE BORN GREAT	ST. JOHNS, ADELA ROGERS	3	9	5	1	265			NO AVAIL
107984	GREAT PEOPLE OF THE BIBLE...	READER'S DIGEST ASSN.		1	7	1	512			NO AVAIL
107992	BABE	CREAMER, ROBERT W.	7	7	6	1	328			NO AVAIL
107993	PIRATE, THE	ROBBINS, HAROLD	6	13	16	1	284			NO AVAIL
107995	PEARL BUCK'S BOOK OF CHRISTMAS	BUCK, PEARL S.				1	310			NO AVAIL
108001	CHAPLIN	MANVELL, ROGER				1	286			NO AVAIL
108006	ONCE UPON A STAGE...	SAMUELS, CHARLES	1	2	1	1	315			NO AVAIL
108007	EISENHOWER, PORTRAIT OF THE HERO	LYON, PETER			1	2	304			NO AVAIL
108066	AH-ONE, AH-TWO LIFE WITH MY MUSIC	WELK, LAWRENCE		1	1	1	614			NO AVAIL
108107	NATURAL FOLK REMEDIES	KORDEL, LELOND	2	2	1	1	123			NO AVAIL
108118	MONEYCHANGERS, THE	HAILEY, ARTHUR	4	7	7	1	577			NO AVAIL
108120	STING, THE	WEVERKA, ROBERT	1	3	3	1	252			NO AVAIL
108121	UFO'S EXPLAINED	KLASS, PHILIP J.	3	4	2	1	258			NO AVAIL
108138	RAINBOW, A NOVEL	BUCK, PEARL S.				1	341			NO AVAIL

REFERENCE LIST OF SYSTEM DOCUMENTATION AND RESOURCE MATERIALS

A list of some of the materials that were analyzed during the course of this study is presented below. The list is divided into three sections: items pertaining to NLS/BPH and NLS/BPH library functions; items from or about the Libraries participating in the study; and items about the commercially available systems. Most of the materials are unpublished documents that have been prepared by or for the Libraries, and only the title and date of preparation are provided. If formal title information was not given on a cover page, an unofficial title has been supplied by Cuadra Associates; these supplied titles are presented in brackets. Full citation information is provided (if available) for published works.

1. General Documentation

Association of Specialized and Cooperative Library Agencies. Standard for Library Service to the Blind and Physically Hanidcapped Subcommittee. Standards of Service for the Library of Congress Network of Libraries for the Blind and Physically Handicapped. Chicago: American Library Association, 1979.

Battelle Columbus Laboratories. Manual Circulation Handbook for Network Libraries. Washington, D.C.: National Library Service for the Blind and Physically Handicapped, Library of Congress, January, 1981.

Handbook for Network Libraries, National Library Service for the Blind and Physically Handicapped (June 1980)

[Information Package, National Library Service for the Blind and Physically Handicapped, Library of Congress]

Transcript of the Automation Conference of the National Library Service for the Blind and Physically Handicapped (May 11, 1979)

2. Library System Documentation

Alabama

[Data Processing Manual] (1979-80)

[User Manual] (1980)

California (Los Angeles)

The Computer System of the Braille Institute Library; a Feasibility Study (June 1977)

2. Library System Documentation (continued)

California (Sacramento)

Circulation/Inventory Control System: System Design Specifications (May 1977)

[Circulation System Questionnaire] (1977)

[Circulation System Questionnaire Responses] (1977)

[Invitation for Bid to Supply a Computerized Circulation System for the Sacramento Regional Library] (1978)

Colorado

Computer Assisted Book Circulation System Introduction (June 1980)

[Operator instructions] (1979)

Proposed Enhancements to LBPH Automated Systems (1980)

Florida

Bureau of Blind Services Talking Book Library: Specifications for Automated Circulation and Inventory Control System (1975)

Status of Computer Activity at Regional Libraries for the Blind and Physically Handicapped: Summer 1976 (1976)

Illinois

On-Line Circulation Control System for the Illinois Regional Library for the Blind and Physically Handicapped and the Subregional System (1979)

Massachusetts (Worcester)

Automation in the Massachusetts Subregional Talking Book Library (1978)

[System Documentation] (1977)

Michigan (Lansing)

Blind and Physically Handicapped Library Communications Network Operator's Manual (1977)

New Jersey

Specifications for Automated Circulation and Inventory Control System (1977)

New York (Albany)

Anderson, Jean D. The New York State Library for the Blind and Visually Handicapped Automated Circulation System. Albany: University of the State of New York, 1978

Library for the Blind and Visually Handicapped Automated System User's Manual (Revised July 1980)

2. Library System Documentation (continued)

Ohio (Cincinnati)

Wessells, Michael E., et al. A Study of the Braille and Talking Book Program in Ohio: Final Report. Columbus, Ohio: Battelle Memorial Institute, February 1979.

ABCD Automation of Blind Library and Cassette Duplication Quarterly Narrative Reports (1975-76)

[IBM Data Processing, ABCD Project] (August 1975)

An Independent Evaluation of the ABCD Project (April 1979)

Summary of the IBM System Planned for the Library for the Blind and Physically Handicapped (1975)

Ohio (Cleveland)

Project ACCESS Quarterly Reports (1974-1977)

Pennsylvania

[Request for Proposals for an automated circulation system] (September 1975)

[System User Manual] (1977)

Texas

Texas State Library Data Processing Requirements (1975)

Wisconsin

Wisconsin Regional Library for the Blind and Physically Handicapped Automated Circulation Description (February 1980)

3. Commercial Systems Documentation

Automated System Research & Development, Inc. An Automated Circulation System for the Libraries for the Blind and Physically Handicapped

Data Research Associates, Inc. Users Reference Guide: Library for the Blind and Physically Handicapped Version II Users Reference Guide (October 1980)

Neoterics, Inc. REACH: Remote Access Circulation for the Handicapped (1976)

APPENDIX A

Library Profiles

This Appendix contains a Profile for each of the Libraries included in this study. Each Profile is presented in a uniform format and includes the following information:

Name. Library name, address, and telephone number.

Director. Name of Director or Head of Regional Library.

Founding. Year in which service to blind and physically handicapped individuals began and year in which the operating library became a member of the NLS/BPH network.

Sponsor. Name of sponsoring agency and, as applicable, relevant information on operating agencies and funding support.

Staff. Number of professional and support staff.

Service. Includes description of geographical area that is served and, as appropriate, relationship of Library to other Regional and Subregional Libraries in the state. Also provides the following statistics: total numbers of individual and institutional borrowers on mailing lists and/or the number of individual and institutional borrowers that are actively being served; annual circulation; average number of borrowers served per month; and average number, generally per day, of on-site borrowers.

Holdings. Provides title and copy data (as available) for various book media, magazines, and equipment. An indication is given if a particular type of material is not handled in the computerized circulation system.

System Brief. Covers the following information, as available, on each system: operational status; functions performed, including any special characteristics, and for which types of materials; types of services that are accommodated; method used by staff to access data; report generation capabilities; planned enhancements; system developer; hardware configuration; and programming language.

ALABAMA REGIONAL LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED

Alabama Public Library Service
6030 Monticello Drive
Montgomery, Alabama 36130
205/277-7330

DIRECTOR Miriam Pace

FOUNDING Alabama initiated its library service to blind and physically handicapped individuals in 1965. The Alabama Public Library Service assumed responsibility for operation of the Regional Library in 1978.

SPONSOR Alabama Public Library Service, a state agency.

STAFF A total of 15 staff members: 5 professional and 10 support.

SERVICE The Regional Library provides direct service to eligible borrowers in 39 Alabama counties and backup support to seven subregional libraries that service the remaining 28 counties. Beginning in mid-1981, the Library, under contract to NLS/BPH, will also assume responsibility for service to eligible U.S. citizens abroad who were previously served by NLS. The Library serves 1,938 (about 1,800 active) individual borrowers and 160 (all active) institutional borrowers. In 1980, the Library circulated 76,896 items (including books, magazines, and equipment). Service is provided to about 700 individual and 50 institutional borrowers each month; on-site service is provided to about 15 individuals per week.

HOLDINGS Book Data. The Library has 147,876 copies of 31,774 titles.

Disk:	16,704 titles; 79,520 copies.
Cassette:	10,070 titles; 63,356 copies.
Braille:	5,000 titles; 15,000 copies.

Magazine Data. (automation in process)

Mailed by Library: 3 disk and 6 cassette titles; 829 subscriptions.

Mailed by Producer: (not available)

Equipment Data. (automation in process)

2 machine types:	17,193 units
3 accessory types:	1,349 units

ALABAMA (2)

SYSTEM BRIEF

The Regional Library is in the process of developing and implementing an interactive system that is based on the model developed by the Regional Library in Lansing, Michigan. At present, the system functions in a "manual" mode. Library- and borrower-generated requests, assignments, and returns are entered individually through CRT terminals. Files can be updated online and queried interactively. Both turn-around and will-call service modes are accommodated. The system produces NLS/BPH-required reports on borrowers and book circulation. Planned enhancements include the implementation of automatic book check-out and the addition of equipment- and magazine-circulation functions.

The system was developed by data processing personnel from the Alabama Public Library Service in close conjunction with Regional Library staff. It is operated through leased telephone lines to the State Data Processing Service's mainframe computer, located several miles away. The State's system includes:

- Sperry Univac 90/80 computer (3MB memory), with VS/9 operating system
- 33 Sperry Univac 8433 disk units (200 MB each)
- 9 Sperry Univac U34 9-track tape drives (1 drive, 800 bpi; 8 drives, 1600 bpi)

The equipment on-site at the Library includes:

- 6 Sperry Univac UTS 400 Slave terminals (4800 baud)
- 2 Sperry Univac 786 printers (200 characters per second, bi-directional)
- 6 Paradyne MP48 modems

The circulation system is programmed in COBOL 74. It operates in a 1MB virtual partition of the 3MB memory, and utilizes approximately 36.5MB disk storage, which the Library plans to expand to 100MB in the near future.

BRAILLE INSTITUTE OF AMERICA, INC. LIBRARY

741 North Vermont Avenue
Los Angeles, California 90029
213/663-1111 (Extension 280)

DIRECTOR Phyllis Cairns

FOUNDING The Braille Institute initiated book service to blind individuals in the 1920s. It became an NLS/BPH Regional Library in 1934.

SPONSOR Braille Institute of America, Inc., an independent, non-profit organization. The California Department of Education, State Library provides the operating budget for the Library, but all capital costs are funded through the Institute.

STAFF A total of 30 staff members: 3 professionals and 27 support.

SERVICE The Braille Institute Library serves eligible individuals and institutions in 10 Southern California counties, from San Luis Obispo to the Mexican border, as well as braille readers in Arizona. It has 13,096 (11,992 active) individual borrowers and 610 (606 active) institutional borrowers, and circulates approximately 390,000 items (including books and magazines) annually. About 4,400 individual and 100 institutional borrowers are served each month. On-site service is provided to an average of 70 individuals per day.

HOLDINGS Book Data. The Library has 227,560 copies of 24,518 titles in disk, cassette, braille, and reel-to-reel tape formats.

Magazine Data. (not available)

Equipment Data. (not automated)

2 machine types:	27,941 units
2 accessory types:	20,000 to 25,000 units

SYSTEM BRIEF The Library's first system, based on an IBM inventory-control software package, was developed in 1971. The Library used this system to circulate books for nearly nine years before converting, in 1980, to the Data Research Associates, Inc. (DRA) system. Book circulation, including automatic selection and check-out, is now fully operational under Version II of the DRA software. Equipment and magazine circulation will begin when those databases

have been entered into the system. Calendar, turn-around, and will-call service modes are accommodated. Special service needs may also be indicated, with explanations and instructions appearing in a NOTES section of the borrower record. The system generates NLS/BPH-required reports and monthly borrower, collection, and circulation reports. Borrower, book, request, reserve, has-now, has-had, and subject data can be updated online and queried interactively. A planned modification to the system by DRA will permit the Library to provide computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system.

The DRA system operates on a Digital Equipment Corporation (DEC) minicomputer located at the Braille Institute. The Library's system configuration includes:

- DEC PDP 11/70 computer (396K memory), with RSTS/E operating system
- 2 DEC RM03 disk units (76MB storage capacity each)
- 1 DEC TWE16 9-track tape drive (800/1600 bpi)
- 14 DEC VT100 CRT terminals (9600 baud)
- 1 NEC Spinwriter 5520 printer (55 characters per second)
- DEC LP11 printer (300 lines per minute)
- 6 Recognition Equipment Class 120 OCR scanners

The DRA circulation system is programmed in BASIC PLUS2 and DEC MACRO 11.

BOOKS FOR THE BLIND AND PHYSICALLY HANDICAPPED
CALIFORNIA STATE LIBRARY

600 Broadway
Sacramento, California 95818
916/322-4090

DIRECTOR Marion Bourke

FOUNDING The California State Library initiated service to blind individuals in 1905. It became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR California Department of Education, State Library

STAFF A total of 23 staff members: 4 professional and 19 support (3 paraprofessionals and 16 clerical).

SERVICE The Regional Library serves eligible borrowers in 48 Northern California counties. It has 8,325 individual and 796 institutional borrowers, all of them active. In 1980, the Library circulated 439,575 items, including books and magazines. Service is provided to an average of 8,325 individual and 796 institutional borrowers each month. On-site service is provided to four to five individuals per day.

HOLDINGS Book Data. The Library has over 185,000 copies of over 9,000 titles.

Disk:	87,310 copies; (title data not available).
Cassette:	90,815 copies; (title data not available).
Braille:	9,000 titles; 15,000 copies.

Magazine Data. (not automated)

Mailed by Library:	3 disk, 4 cassette, and 2 braille titles; 1,855 subscriptions.
Mailed by Producers:	37 disk, 3 cassette, 36 braille, and 2 large print titles; (number of subscriptions not available).

Equipment Data.

2 machine types:	14,346 items
3 accessory types:	2,178 items

SYSTEM BRIEF

Version I of the Data Research Associates, Inc. (DRA) system has been fully operational in the Library since October 1978. The system performs all equipment and book circulation functions, including automatic book selection and check-out. Calendar, turn-around, and will-call service modes are accommodated. Special service needs may also be indicated, with explanations and instructions appearing in a NOTES section of the borrower record. The system generates NLS/BPH-required reports and monthly borrower, collection, and circulation reports. Borrower, book, request, reserve, has-now, has-had, and subject data can be updated online and queried interactively. The Library is converting to Version II of the DRA system, and will use the system to handle circulation of magazines. A modification planned for this version will also permit the Library to send computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system.

The DRA system operates on a Digital Equipment Corporation (DEC) minicomputer located at the Regional Library. The system hardware configuration includes:

- DEC PDP 11/70 computer (320K memory)
- 2 DEC RM03-AA disk units (76MB each) [third unit is on order]
- 1 DEC TWE16-AA 9-track tape drive (800/1600 bpi)
- 10 DEC VT52-AE CRT terminals (9600 baud)
- 1 DEC VT100 CRT terminal (1200-9600 baud)
- 2 Diablo HY-TERM 1620 printer terminals (45 characters per second)
- 1 DEC LP11-WA printer terminal (230 lines per minute)
- 1 Decwriter Console LA36
- 3 Recognition Equipment Class 120 OCR scanners
- DEC DH11-AD asynchronous multiplexers (provides 16 lines)

The DRA circulation system is programmed in BASIC PLUS2 and DEC MACRO 11.

COLORADO STATE LIBRARY
SERVICES FOR THE BLIND AND PHYSICALLY HANDICAPPED

1313 Sherman Street
Denver, Colorado 80203
303/866-2081

DIRECTOR James M. Schubert

FOUNDING Denver Public Library became an NLS/BPH Regional Library (one of the original 19 libraries in the network) in 1931. Regional Library responsibilities were transferred to the Coloardo State Library in 1969.

SPONSOR Colorado Department of Education, State Library

STAFF A total of 10.5 full-time equivalent staff members: 3 professionals and 7.5 support (5 paraprofessionals and 2.5 clerical).

SERVICE The Regional Library serves all disk, cassette, and large-print readers throughout Colorado and also functions as the repair agency for cassette equipment held by borrowers in Wyoming. (Braille service in the state is provided by the Utah Regional Library.) The Library has 4,031 individual and 270 institutional borrowers, all of them active. It circulated 187,808 items (including books and magazines) in 1980. On-site service is provided to about three or four individuals per day.

HOLDINGS Book Data. The Library has 74,801 copies of 16,876 titles.

Disk:	8,833 titles;	37,490 copies.
Cassette:	6,613 titles;	35,361 copies.
Large Print:	1,430 titles;	2,050 copies. (not automated)

Magazine Data. (not automated)

Mailed by Library: 3 disk and 7 cassette titles; 2,551 subscriptions.

Mailed by Producer: 37 disk titles; 5,378 subscriptions.

Equipment Data. (not automated)

2 machine types: 7,559 serviceable units
3 accessory types: 1,022 units

SYSTEM BRIEF

The system performs all book circulation functions, including automatic selection and check-out, for disks and cassettes. Both turn-around and will-call service modes are accommodated. Borrower, book, reserve, request, and has-now/has-had data can be updated online and queried interactively. The system produces a number of statistical reports: daily activity reports; NLS/BPH-required reports; and monthly inventory, borrower, and circulation reports. Planned enhancements include large-print, magazine, and equipment circulation functions; the capability to send computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system; automatic issuance, in sequence, of titles in a series; preferential selection of returned books for immediate re-distribution; and incorporation of OCR equipment for the check-in of materials.

The system was developed by data processing specialists from the Colorado Department of Education in collaboration with Library staff. The Library uses leased telephone lines to access the system, which resides on a shared Hewlett Packard minicomputer located less than a mile away from the Library. The computer system includes:

- Hewlett Packard (HP) 3000 Series III computer (1MB memory)
- HP 7920 disk unit (50MB) and HP 7925 disk unit (120MB)
- HP 7970E tape drive (9-track, 1600 bpi)
- 2 HP 103R modems (1 for backup) and 3 HP 202R modems (1 for backup)

The Library has on-site the following equipment:

- 2 HP 2640 CRT terminals (1200 baud)
- DEC Decwriter II hardcopy terminal (300 baud)
- HP 103D modem and 2 HP 202D modems

The circulation system is programmed in BASIC, and also utilizes the Hewlett Packard IMAGE and QUERY DBMS software. The program requires 312K memory and 18MB disk storage to operate efficiently.

FLORIDA REGIONAL LIBRARY FOR THE
BLIND AND PHYSICALLY HANDICAPPED

420 Platt Street
P.O. Box 2299
Daytona Beach, Florida 32015
904/252-4722

DIRECTOR Donald John Weber

FOUNDING Services were initiated by the state in 1950. The Library became an NLS/BPH network member in 1951.

SPONSOR Florida Department of Education, Division of Blind Services.

STAFF A total of 29 staff members (excluding work study, CETA, volunteer, and other supplemental workers): 5 professional and 24 support.

SERVICE The Regional Library provides direct book circulation service to most borrowers in the state. Subregional libraries serve approximately 30 percent of the eligible borrowers. The Regional Library is also the central control point for the distribution of machines and magazines and, under contract, functions as the NLS/BPH Multistate Center of the South. The Florida network has 18,327 individual and 1,317 institutional borrowers, all of them active. Of these, about 7,000 are served by six subregional libraries. In fiscal year 1980 the network circulated 647,640 items (including books and magazines). On-site service is provided at the Regional Library to an average of 10 individuals per day.

HOLDINGS Book Data. The Regional Library has a total of 268,971 copies of 28,060 titles.

Disk:	9,065 titles;	98,544 copies.
Cassette:	6,294 titles;	145,204 copies.
Braille:	6,294 titles;	9,605 copies.

Magazine Data.

Mailed by Library: 2 disk and 25 cassette titles; 2,976 subscriptions.

Mailed by Producers: 42 disk, 28 cassette, and 42 braille titles; 81,626 subscriptions.

Equipment Data. (not automated)

2 machine types:	25,598 units
2 accessory types:	About 5,200 units

SYSTEM BRIEF

Florida is in the process of modifying and upgrading its first circulation system, which was based on an IBM inventory-control program modified by the Braille Institute in Los Angeles. Book circulation functions, including automatic check-out, have been converted to the new system, while magazine circulation continues to operate on the older system. Both systems function in a non-interactive mode, although interactive inquiry capabilities are currently being installed in the new system. Turn-around service is accommodated for book circulation. The Library now sends its borrower data in computer-readable form to NLS/BPH, for use in its Comprehensive Mailing List system. Planned enhancements include equipment circulation, conversion of magazine circulation to the new system, installation of OCR equipment for the check-in of materials, and refinements to the system's statistical reporting capabilites. The Library also plans, within a year, to begin development of capabilities to support networking with the Florida subregional libraries.

Software for the first system was acquired from the Braille Institute and modified in-house by data processing consultants, who are continuing to work on development of the new system. The original system was implemented on an IBM System 3 minicomputer, while the new system runs on the more powerful IBM System 34 minicomputer. Both machines are located at the Regional Library. The hardware configuration includes:

- IBM System 3 computer (16K memory)
- IBM System 34 computer (96K memory), with built-in hard disk unit (128MB storage capacity) and floppy disk units (2 magazines and 3 individuals, with a total of 27MB storage)
- 2 IBM 5444 disk units (5MB each)
- 1 IBM 3741 floppy disk unit (242K)
- 3 IBM 5251 CRT terminals (9600 baud)
- 1 IBM 5203 printer (200 lines per minute)
- 1 IBM 5211 printer (300 lines per minute)
- 1 IBM 5496 Data Recorder
- 1 Moore Decolator
- 1 Standard Register Burster

Both of the circulation systems are programmed in RPG2.

ILLINOIS REGIONAL LIBRARY FOR THE BLIND
AND PHYSICALLY HANDICAPPED

Chicago Public Library
1055 W. Roosevelt Road
Chicago, Illinois 60608
312/738-9210

DIRECTOR Donna Dziedzic

FOUNDING The Chicago Public Library (CPL) initiated book service to blind individuals in 1894. It became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR The Chicago Public Library operates the Regional Library under contract to the State of Illinois. The State provides most funding, although CPL provides such in-kind services as administrative and data-processing support.

STAFF A total of 29 staff members: 4 professional and 25 support.

SERVICE The Illinois Regional Library provides support and backup services for 16 subregional libraries throughout the state. While the Regional Library serves as the central repository for braille materials, equipment, and disks and cassettes, the subregional libraries maintain borrower records and provide book circulation services for disks and cassettes. Magazine subscription data for borrowers throughout the state are maintained by the Regional Library, which performs all magazine circulation functions.

The Illinois library network serves 12,980 (11,291 active) individual borrowers and 1,430 (1,241 active) institutional borrowers, and circulated 423,029 books in 1980. Most borrowers receive service every month.

HOLDINGS Book Data. The Illinois Regional Library has 163,676 copies of 24,822 titles.

Disk:	9,370 titles; 62,710 copies.
Cassette:	6,471 titles; 52,188 copies.
Braille:	9,056 titles; 27,168 volumes.

Magazine Data.

Mailed by Library:	5 disk, 21 cassette, and 1 braille titles; 7,176 subscriptions.
Mailed by Producers:	36 disk, 3 cassette, and 36 braille titles; over 12,257 subscriptions.

Equipment Data.

2 machine types:	27,968 units
1 accessory type:	3,749 units

SYSTEM BRIEF

Illinois is in the process of installing Version II of the Data Research Associates, Inc. (DRA) system for use throughout the state network. At present, the system is used for book circulation in one of the subregional libraries, in Chicago; the other subregional libraries are entering borrower and holdings data into the system by remote, dial-up access. All 16 subregional libraries will eventually perform their book, magazine, and equipment circulation functions through the DRA system. In addition to drawing upon its own book collection, each subregional will be able to draw upon the resources of the Regional Library and the other subregional libraries. Borrower, book, request, reserve, has-now, has-had, and subject data will be available for online updating and interactive inquiry. A subregional library will have access only to data on those borrowers whom it serves; the Regional Library will have access to all borrower data. When a DRA system modification is completed, the Library will be able to send computer-readable data to NLS/BPH for use in its Comprehensive Mailing List system.

The DRA system operates on a Digital Equipment Corporation (DEC) minicomputer, which is located at the Chicago Public Library. Of the 16 subregional libraries, 14 will utilize the system via dial-up telephone lines; two local-area subregional libraries, in Chicago and the North Suburban area, will be hardwired to the CPL computer. The total system configuration includes:

- DEC PDP 11/70 computer (256K memory), with RSTS/E operating system
- DEC MK11-BF add-on memory (512K)
- 3 DEC RM03-AA disk units (76MB each)
- 1 DEC TWE16-AA 9-track tape drive (800/1600 bpi)
- 31 DEC VT100 CRT terminals (1200-9600 baud)
- 17 NEC Spinwriter 5520 printers (55 characters per second)
- 20 Recognition Equipment Class 120 OCR scanners

- 4 DEC DH11-AD asynchronous terminal multiplexers (provide 16 lines for remote terminals, at speeds from 75 to 9600 baud)
- 1 DEC IP11 printer (230 lines per minute)

The DRA circulation system is programmed in BASIC PLUS2 and DEC MACRO 11.

TALKING BOOK LIBRARY
WORCESTER PUBLIC LIBRARY

Quinsigamond Branch
812 Milbury Street
Worcester, Massachusetts 01607
617/752-3751 (Extension 33)

DIRECTOR — Marlene Temsky

FOUNDING — Worcester Public Library initiated service as a Subregional Library in 1973.

SPONSOR — The Talking Book Library is operated as a Subregional Library by Worcester Public Library, under the auspices of the Central Massachusetts Regional Library System. The Subregional Library is supported primarily through state LSCA funds, although Worcester Public Library provides building space, facilities, and some clerical support.

STAFF — A total of 3 staff members: 1 professional and 2 support. In addition, the Library has 2 paraprofessional positions funded for one year by the Massachusetts Commission for the Blind to help the Library initiate cassette circulation service.

SERVICE — The Subregional Library serves disk and cassette readers in three Central Massachusetts counties. (Braille and magazine services are provided by the Regional Library.) The Subregional Library has 763 individual and 132 institutional borrowers, all of them active, and circulates about 33,500 books annually. Approximately 350 individual and 50 institutional borrowers are served each month. On-site service is now provided to an average of one individual per week; however, this figure is expected to increase significantly when the Subregional Library moves to the main Worcester Public Library building in March 1981.

HOLDINGS — The Subregional Library has 6,800 disk and 4,600 cassette titles.

SYSTEM BRIEF — The system (referred to affectionately as HONEY) performs all disk and cassette circulation functions, including automatic selection. It provides for immediate staff review of each item selected for a borrower in the automatic-selection process. Turn-around and will-call service modes are accommodated. Borrower, book, request, reserve, has-now, and subject data can be updated online and queried interactively. Although NLS/BPH-required reports cannot

be generated, the system provides statistics on borrowers, books, and circulation for library management. Mailing labels are not produced by the system.

The system was developed by consultants from Honeywell Information Systems and specialists from the Worcester Data Processing Department, with guidance from staff of the Subregional Library and Worcester Public Library. Problems that at one point forced the Library to revert to a manual system for 10 months have been remedied, and the automated system has performed all book circulation without incident since June 1980. The system operates through leased telephone lines to a Honeywell mainframe computer located at the Worcester City Data Processing Department, about 3 miles from the Library. The City's hardware configuration includes:

- Honeywell Level 66 computer (2MB), with GCOS DPS-440 operating system
- 8 Honeywell MSU 0540 disk units (156MB each)
- 7 Honeywell MTU 0610 9-track tape drives (1600 bpi)
- 1 Honeywell MTU 0610 7-track tape drive (800 bpi)
- 1 Honeywell Level 6 Datanet DN6641 Frontend Network Processor (32K), with GRTS2 software
- 2 Honeywell PRU1600 printers (1600 lines per minute)

Equipment dedicated to the use of the library includes:

- 4 Honeywell VIP7700 CRT terminals (2400 baud)

The circulation system is programmed in COBOL. It requires about 80K of memory and 6.2MB of disk storage to operate efficiently.

MICHIGAN REGIONAL LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED

Michigan Department of Education
State Library Services
Post Office Box 30007
Lansing, Michigan 48909
517/373-1590

DIRECTOR Julie A. Nicol

FOUNDING The Michigan Regional Library was one of the original 19 members of the NLS/BPH network established in 1931.

SPONSOR Michigan Department of Education, Bureau of Libraries and Adult Extended Learning, and the State Library.

STAFF A total of 24 staff members: 9 professional and 13 support. Of the 24, 5 are assigned to the Library's Media Center.*

SERVICE The Regional Library serves eligible borrowers in all counties outside Wayne County, which is served by its own Regional Library. In fiscal year 1980, the Library served 10,959 individual borrowers and 1,116 institutional borrowers, and circulated over 465,000 items (including books, magazines, and equipment). In a recent month, service was provided to 10,816 individual and 828 institutional borrowers. In 1980, on-site service was provided to an average of 6 individual borrowers per day. Recent budget cuts have reduced the Library's on-site service hours by half and it is likely that this figure will decrease in the future.

HOLDINGS Book Data. The Library has 288,395 copies of 30,886 titles.

Disk:	9,451 titles;	75,479 copies.
Cassette:	5,976 titles;	155,782 copies.
Braille:	8,909 titles;	38,485 copies.
Large Print:	2,738 titles;	8,716 copies.
Media Center Cassettes:	3,812 titles;	9,933 copies. (not automated)

(Braille and Large Print: inventory data)

*The Regional Library also operates a Media Center, which records and circulates educational materials to supplement the Library's basic collection of popular titles.

Magazine Data. (not automated)

Mailed by Library: 4 disk, 9 cassette, and 6 braille titles; 2,470 subscriptions.

Mailed by Producers: 38 disk, 4 cassette, 36 braille, and 1 large-print titles; (subscriptions not known).

Equipment Data. (inventory system)

15 machine models: 21,140 items
4 accessory types: 3,089 items

SYSTEM BRIEF

The Library's automated circulation system has been operational since July 1977. It performs all circulation functions, including automatic book selection, for disks and cassettes. The system also provides for maintenance of equipment and collection (recorded, braille, and large print) inventory data. Borrower, book, request, has-now, has-had, and equipment data can be updated online and queried interactively. Turn-around and will-call service modes are accommodated. The system produces statistics that the library staff combine with statistics from the manual operations to produce NLS/BPH- and state-required reports. The Library plans eventually to use its system as well to handle borrower profiles, collection and equipment inventory, and recordkeeping for the Media Center.

The system was developed by specialists from the Department of Education Data Processing Unit in conjunction with Library staff. The primary system designer worked at the Library site during development. The system operates through leased telephone lines with the remotely located State's mainframe computer system, which includes:

- Honeywell 3200 computer (512K memory)
- 8 Honeywell 277 disk units (64MB each)
- 7 Honeywell 279 disk units (128MB each)
- 1 Honeywell 203B 9-track tape drive (1600 bpi)
- 2 Honeywell 222 printers (1200 lines per minute)

The number of on-site CRT terminals is not available. The system is programmed in COBOL.

WOLFNER MEMORIAL LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED

1808 Washington Avenue
St. Louis, Missouri 63103
314/241-4227

DIRECTOR — Pennie D. Peterson

FOUNDING — St. Louis Public Library established a Department of Blind Services in 1924. In 1931, the Department became an NLS/BPH Regional Library (one of the original 19 libraries in the network). The Regional Library was renamed the Wolfner Memorial Library in 1934 and, since 1977, has operated as part of the Missouri State Library.

SPONSOR — Missouri State Library, under the State Coordinating Board of Higher Education.

STAFF — A total of 19 staff members: 3 professional, 15 support, and 1 system manager for the automated circulation system.

SERVICES — The Regional Library serves eligible borrowers throughout Missouri. In fiscal year 1980, it served 7,014 individual and 295 institutional borrowers, all of them active, and circulated 318,518 books. In a recent month, it served 6,253 individual and 412 institutional borrowers. On-site service is provided to an average of 10 individuals per day.

HOLDINGS — Book Data.

Disk:	62,442 containers (title data not available).
Cassette:	59,373 containers (title data not available).
Braille:	6,750 volumes (title data not available).

Magazine Data. (not available)

Equipment Data. (automation in process)

2 machine types:	2,890 items
3 accessory types:	361 items

SYSTEM BRIEF — The Library performs all equipment and book circulation functions, including automatic selection and check-out, using Version II of the Data Research Associates, Inc. (DRA) system. Magazine circulation will become fully operational when the entry of

magazine and subscription data into the system is completed. Calendar, turn-around, and will-call service modes are accommodated. Special service needs may also be indicated, with explanation and instructions appearing in a NOTES section of the borrower record. The system generates NLS/BPH-required reports and monthly borrower, collection, and circulation reports. Borrower, book, request, reserve, has-now, had-had, subject, magazine, and equipment data can be updated online and queried interactively. A modification planned by DRA will permit the Library to produce computer-readable borrower data to send to NLS/BPH for use in its Comprehensive Mailing List system.

The Library operates the DRA system through leased telephone lines to a Digital Equipment Corporation (DEC) minicomputer located at the St. Louis Public Library, which also uses the system. The hardware configuration that is shared includes:

- DEC PDP 11/70 (896K), with RSTS/E operating system
- 2 DEC RP06 disk units (176MB each)
- 2 DEC TE16 9-track tape drives (800/1600 bpi)
- 1 Diablo 1345A printer terminal (300 baud)
- 1 DEC LP11 printer terminal (1250 lines per minute)

Equipment dedicated to use by the Regional Library includes:

- 3 DEC VT100 CRT terminals (1200 baud)
- 4 DEC VT52 CRT terminals (1200 baud)
- 3 Recognition Equipment Class 040 OCR scanners
- 8 Vadic 1240MX modems (provides a total of 16 lines)

The system is programmed in BASIC PLUS2 and DEC MACRO 11.

NEW JERSEY LIBRARY FOR THE
BLIND AND PHYSICALLY HANDICAPPED

1676 North Olden Avenue Extension
Trenton, New Jersey 08638
609/292-6450

DIRECTOR Marya Hunsicker

FOUNDING New Jersey instituted a Regional Library for the state in 1966.

SPONSOR New Jersey Department of Education, State Library

STAFF A total of 28 full-time equivalent staff members: 5 professional (including 1 temporary) and 23 support. Provisional approval has been received for 9 additional positions.

SERVICE The Library serves all eligible borrowers in the state. It has 9,800 (about 7,000 active) individual borrowers and 450 (about 300 active) institutional borrowers, and circulates about 350,000 items (including books and magazines) annually. Approximately 4,800 individuals and 180 institutions receive service each month. On-site service is now provided to an average of 5 individuals per day and is expected to increase significantly when the Library moves to its new building, now under construction.

HOLDINGS Book Data. The Library has a total of 216,343 copies of 27,403 titles.

Disk:	9,804 titles;	117,470 copies.
Cassette:	8,997 titles;	85,569 copies.
Braille:	5,323 titles;	7,771 copies.
Large Print:	3,279 titles;	5,506 copies.

Magazine Data.

Mailed by Library:	3 disk and 13 cassette titles; 1,855 subscriptions.
Mailed by Producers:	38 braille and 40 disk titles; (subscription data not available).

Equipment Data. (not applicable)

SYSTEM BRIEF The REACH (REmote Access Circulation for the Handicapped) system performs all book circulation functions, including automatic selection and check-out, for all media. REACH also has modules

for magazine and equipment circulation (although the equipment module is not utilized by the Library). Calendar, turn-around, and will-call service modes are accommodated. Service types and interest codes for automatic selection are specified for each medium. Borrower, book, request/has-now, has-had, magazine, magazine subscription (by borrower and by magazine) data can be updated online and queried interactively. The system produces NLS/BPH-required reports as well as monthly borrower, circulation, book, and other management reports.

A search feature allows staff to combine up to eight parameters of borrower and book data to define specific subsets of the database. The results of the search can be used to create a subset of borrowers for which mailing labels/cards are generated or a subset of borrowers or books on which particular information is to be displayed or printed. For example, the staff can retrieve a set of all active male borrowers in a particular county who read braille and have selected "sports" as one of their interests.

REACH was developed by Neoterics, Inc. It operates on a Hewlett Packard (HP) minicomputer, located on-site. The system hardware configuration includes:

- HP 1000 Series computer, 2112A Processor (64K memory), with RTE-III operating system
- 2 HP 7905 disk units (15MB each)
- 1 HP 2645 CRT terminal (9600 baud)
- 3 HP 2640 CRT terminals (2400 baud)
- 1 Data Products printer (300 lines per minute)

The circulation system is programmed in FORTRAN.

NEW YORK STATE LIBRARY FOR THE
BLIND AND VISUALLY HANDICAPPED

Cultural Education Center
Empire State Plaza
Albany, New York 12230
518/474-5935

REGIONAL LIBRARIAN — Audrey Smith

FOUNDING — The New York State Library initiated braille lending service in 1896. It became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR — State Education Department, New York State Library.

STAFF — A total of 25 staff members: 5 professional and 20 support. (Because of several vacancies, the support staff is presently not up to its full funding level.)

SERVICE — The Regional Library serves eligible borrowers throughout the state, excluding New York City and Long Island. It serves approximately 13,300 borrowers, of which 1000 are institutional borrowers that serve about 24,000 individuals, all of them active, and circulates about 350,000 books annually. On-site service is provided to an average of 2 individuals per day.

HOLDINGS — Book Data. The Library has a total of 412,918 copies of 22,348 titles.

Disk:	8,909 titles;	280,887 copies.
Cassette:	5,319 titles;	105,049 copies.
Braille:	8,120 titles;	26,982 copies.

Magazine Data. (not available)

Equipment Data. (not available)

SYSTEM BRIEF — The system performs book circulation functions for all media. It allows for online data entry through 5 CRT terminals, although modifications to the database and all circulation transactions are processed in a batch mode overnight. Borrower, book, request, has-now, and has-had data, reflecting modifications made during

the previous evening's update, can be retrieved and displayed during the day. Turn-around service is accommodated; a calendar-service option is available but is not currently in use. The system produces NLS/BPH- and state-required borrower, collection, and circulation reports, as well as a number of library management reports. Among the system enhancements under consideration are refinements to the book check-out process; interactive data entry and real-time updating of the database; and the capability to produce computer-readable data for use by NLS/BPH in its Comprehensive Mailing List system.

The system was developed by specialists from the State Education Department, Division of Electronic Data Processing, working in conjunction with Library staff. It was originally implemented in October 1975 on the Education Department's Control Data Corporation mainframe computer. In March 1979, the system was converted to operate on a Burroughs mainframe computer. The Library application group within the Division of Electronic Data Processing recently enhanced database processing by taking advantage of the new computer's more powerful database management system capabilities to increase operating efficiency. The circulation system operates on the State Education Department's computer via leased telephone lines. The hardware configuration, which supports a number of applications, includes:

- Burroughs B7765 computer (6MB memory), with Master Control Program Level 3.1 operating system

Equipment dedicated for Library use includes:

- 2 Burroughs B9383 disk units (2MB each)
- 1 Burroughs B9495 9-track tape drive (1600 bpi)
- 7 Hazeltine 2000 CRT terminals (1200 baud)
- 1 General Electric Terminet 1200 printer (120 characters per second)

The circulation system requires 35K of memory to operate efficiently. It is programmed in COBOL.

LIBRARY FOR THE BLIND AND PHYSICALLY HANDI[illegible]PPED
NEW YORK PUBLIC LIBRARY

166 Avenue of the Americas
New York, New York 10013
212/925-1011

DIRECTOR Barbara Nugent

FOUNDING The Free Circulating Library for the Blind, a private library founded by Richard R. Ferry, began providing library service to blind individuals in 1895. In 1903, it was incorporated into the New York Public Library, which became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR The Regional Library is a member of the New York Public Library System. It receives operational support from the New York State Education Department, project funds through LSCA, and administrative support from the New York Public Library.

STAFF A total of 25 staff members: 9 professionals and 16 support (2 paraprofessionals, a computer operator, a driver, and 12 clerks.)

SERVICE The Regional Library provides service to eligible borrowers in New York City and, in cooperation with two subregional libraries, to those located on Long Island. Braille materials and most locally distributed magazines circulate directly from the Regional Library. In combination, these libraries serve 15,337 individual and 1,177 institutional borrowers; the Regional Library serves 8,042 individuals and 512 institutions. In 1980, the Regional Library circulated about 247,000 items (including books, magazines, and equipment). About 4 individuals receive on-site service per day.

HOLDINGS Book Data. The Regional Library has 7,855 braille copies and 180,623 disk and cassette copies.

Magazine Data.

Mailed by Library:	1 braille and 4 disk titles; 915 subscriptions.
Mailed by Producers:	36 braille, 37 disk, and 5 cassette titles; (subscription data not available).

Equipment Data.

2 machine types:	23,243 items
2 accessory types:	2,350 items

SYSTEM BRIEF

In September 1979, the Regional Library replaced its manual circulation system, which employed notched cards, with the Data Research Associates, Inc. (DRA) circulation system. Equipment and book circulation functions, including automatic selection and check-out, are fully operational with Version II of the DRA software. Circulation of magazines to subscribers and non-subscribers will be implemented. Calendar, turn-around, and will-call service modes are accommodated. Special service needs may also be indicated, with explanations and instructions appearing in a NOTES section of the borrower record. The system generates NLS/BPH-required reports and monthly borrower, collection, and circulation reports. Borrower, book, request, reserve, has-now, has-had, subject, and equipment data can be updated online and queried interactively. A planned DRA modification will permit the Library to send computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system.

The DRA system operates on a Digital Equipment Corporation (DEC) minicomputer located at the Regional Library. The hardware configuration includes:

- DEC PDP 11/70 (256K memory)
- 3 DEC RM03 disk units (56MB each)
- 1 DEC TE16 9-track tape drive (1600 bpi)
- (Number not given) DEC VT100 CRT terminals (9600 baud)
- 1 DEC LP05 printer
- 7 Recognition Equipment Class 040 OCR scanners

The system is programmed in BASIC PLUS2 and DEC MACRO 11.

LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED

444 West Third Street
Cincinnati, Ohio 45202
513/369-6074

DIRECTOR Mary Jo Holcomb

FOUNDING The Cincinnati Society for the Blind initiated book service to blind individuals in Cincinnati in 1901. The Public Library of Cincinnati and Hamilton County later assumed these responsibilities and became an NLS/BPH Regional Library (one of the original 19 libraries in the network), in 1931.

SPONSOR The Public Library of Cincinnati and Hamilton County operates the Cincinnati Regional Library under contract to the State of Ohio. Funding to date has been on a formula basis, but this will change to a fixed budget figure with the 1981-82 fiscal year.

STAFF A total of 11.5 full-time equivalent staff members: 1 professional and 10.5 support.

SERVICE The Regional Library serves eligible borrowers in 33 southern Ohio counties. The Library serves 6,553 individual borrowers, approximately 4,000 active, and 1,000 institutional borrowers, approximately 235 active. It circulated 200,939 items (including books and magazines) in 1980. On-site service is provided to an average of 2 individuals per day.

HOLDINGS Book Data. The Library has 116,745 copies of 18,691 titles.

Disk:	8,600 titles; 67,348 copies.
Cassette:	5,784 titles; 42,667 copies.
Braille:	4,307 titles; 6,730 copies.

Magazine Data. (not automated)

Mailed by Library:	4 disk and 16 cassette titles; 1,524 subscriptions.
Mailed by Producers:	49 disk, 4 cassette, and 36 braille titles; 4,318 subscriptions.

Equipment Data. (not applicable)

SYSTEM BRIEF

The system performs all book circulation functions, including automatic selection and check-out, for all media handled by the Library. Both turn-around and will-call service modes are accommodated. The borrower, book, request, has-now, and has-had data are maintained in several primary files. From these, a number of secondary files, including subject and author files, as well as a request file, arranged by borrower number, are generated periodically. All files can be queried interactively, although only primary files can be updated immediately at the terminal. The system produces NLS/BPH-required reports and more detailed statistics for state-required reports. The Library plans two enhancements to the system. One will permit the sending of computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system. The other will allow borrowers to request calendar-based circulation service.

The system was developed by data processing specialists (including a former director of the Regional Library) from the Public Library of Cincinnati and Hamilton County who worked with IBM consultants. It runs on an in-house IBM minicomputer. The system hardware configuration includes:

- IBM 5340 System 34 computer (has been upgraded from 64K to 128K memory)
- 1 IBM 62 PC disk unit (has been upgraded from 62MB to 128MB)
- 1 IBM 3741 floppy disk unit, upgraded from one slot to a 2-sided, dual-density, format 2 10-diskette magazine (1.2MB per diskette)
- 4 IBM 5251 CRT terminals (9600 baud)
- 1 IBM 5211 printer (upgraded from 200 lines per minute to 300 lines per minute)

The system is programmed in RPG2.

CLEVELAND PUBLIC LIBRARY
LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED

325 Superior Avenue
Cleveland, Ohio 44114
216/623-2911

DIRECTOR — Ervin J. Gaines (Director, Cleveland Public Library)
Jacqueline H. Goodin (Head, Library for the Blind and Physically Handicapped)

FOUNDING — The Cleveland Public Library became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR — The Cleveland Public Library operates the Northern Ohio Regional Library through an agreement with the State Library of Ohio. Funding to date has been on a formula basis but this will change to a program budget figure with the 1982 fiscal year.

STAFF — A total of 19.9 full-time equivalent staff members: 3 professional and 16.9 support.

SERVICE — The Regional Library serves eligible borrowers in 55 northern Ohio counties. In 1980, it had 11,234 (8,269 active) individual borrowers and 872 (702 active) institutional borrowers, and it circulated 390,254 items (including books and magazines). In a recent month, the Library served about 8,700 individual and 600 institutional borrowers. On-site service is provided to an average of five individuals per week.

HOLDINGS — Book Data. The Regional Library has a total of 161,511 books.

Disk:	83,883	items; (title data not available).
Cassette:	71,933	items; (title data not available).
Braille:	5,695	volumes; (title data not available).
Reel-to-reel:	150	masters (titles).

Magazine Data. (estimated)

Mailed by Library:	4 disk, 3 cassette, and 3 braille titles; (subscription data not available).
Mailed by Producers:	34 disk and 21 braille titles; (subscription data not available).

Equipment Data. (not applicable)

SYSTEM BRIEF

The Library's first automated circulation system was in operation from mid-1977 to April 1979, when use of the Data Research Associates, Inc. (DRA) system was instituted. Since August 1980, the Library has used Version II of the DRA system to perform all book circulation functions, including automatic selection and check-out. The Library will also use the system for circulation of magazines to subscribers and non-subscribers. Calendar, turn-around, and will-call service modes are accommodated. Special service needs may also be indicated, with explanations and instructions appearing in a NOTES section of the borrower record. The system generates NLS/BPH-required reports and monthly borrower, collection, and circulation reports. Borrower, book, request, reserve, has-now, has-had, and subject data can be updated online and queried interactively. The Regional Library is planning to supply computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system.

The DRA system operates on a Digital Equipment Corporation (DEC) minicomputer, located at the Cleveland Public Library, which will also begin using the DRA circulation system (on a second DEC minicomputer) for service to the general public in spring 1981. The Regional Library's hardware configuration, which supports several applications, includes:

- DEC PDP 11/70 computer (2MB memory), with RSTS/E operating system
- 4 DEC RP06 disk units (176MB each)
- 2 DEC RM05 disk units (256MB each)
- 2 DEC TE16 9-track tape drives (800/1600 bpi)
- 32 DEC VT100 CRT terminals (variable, up to 19,200 baud)
- 1 DEC LA36 printer terminal (110-300 baud)
- 1 DEC LP05-WA printer (240 lines per minute)
- 2 NEC Spinwriter 5520 printers (55 characters per second)
- 3 Recognition Equipment Class 040 OCR scanners

The DRA circulation system is programmed in BASIC PLUS2 and DEC MACRO 11.

LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED
FREE LIBRARY OF PHILADELPHIA

919 Walnut Street
Philadelphia, Pennsylvania 19107
412/687-2440

DIRECTOR Michael P. Coyle

FOUNDING The Free Library of Philadelphia initiated service to blind individuals in 1898. It became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR Since 1962, under contract to the State Library of Pennsylvania, the Free Library of Philadelphia has operated the Regional Library that serves the eastern counties in Pennsylvania.

STAFF A total of 26 staff members: 4 professional and 22 support.

SERVICE The Regional Library provides service to disk, cassette, and large-print readers in Eastern Pennsylvania and to braille readers throughout Pennsylvania and West Virginia. It has about 11,000 individual and 800 institutional borrowers, all of them active. Each borrower's file is reviewed for service by a staff member every month. In 1980, the Library circulated 583,104 items (including books, magazines, and equipment). On-site service is provided to an average of 75 individuals per day.

HOLDINGS Book Data (estimated). The Regional Library has about 372,000 copies of about 25,000 titles.

Disk:	10,000 titles; 250,000 copies.
Cassette:	5,000 titles; 100,000 copies.
Braille:	6,000 titles; 10,000 copies.
Large Print:	4,000 titles; 12,000 copies.

Magazine Data. (not available)

Equipment Data. (not available)

SYSTEM BRIEF The system performs all book circulation functions, including automatic selection. It also provides for immediate staff review of each item selected for a borrower in the automatic-selection process. The system supports magazine circulation by providing mailing labels for subscribers, in a specified order, as copies of

a particular issue become available. The system handles calendar, turn-around, and will-call service modes. Borrower, book, request, has-now, has-had, subject, magazine, and equipment data can be updated online and queried interactively. The system produces NLS/BPH-required reports as well as library management reports, including one used for weeding. The Pennsylvania Regional Libraries are currently modifying the system to produce computer-readable data for use in the NLS/BPH Comprehensive Mailing List system.

The system was developed for both Pennsylvania Regional Libraries by consultants with library experience. The primary system designer, a professor of library and information science, continues to provide maintenance and development support through the firm of Automated Systems Research and Development. An in-house Digital Equipment Corporation (DEC) minicomputer is used to run the system. The hardware configuration includes:

- DEC PDP 11/35 computer (96K memory) with RSX-11M operating system
- 3 DEC RPRO2 disk units (20MB each)
- 1 DEC TSO3 9-track tape drive (800 bpi)
- 1 DEC LA36-DE printer terminal (110-300 baud)
- 1 DEC LA34 printer terminal (110-300 baud)
- 1 DEC VT100 CRT terminal (variable, up to 9600 baud)
- 10 DEC VT52-AA CRT terminals (variable, up to 9600 baud)
- 1 DEC LIO5 printer (300 lines per minute)
- 1 Dataroyal VSP IPS-7000 printer (120 characters per second)

The circulation system is programmed in FORTRAN IV and DEC MACRO 11.

LIBRARY FOR THE BLIND AND PHYSICALLY HANDICAPPED
CARNEGIE LIBRARY OF PITTSBURGH

4724 Baum Boulevard
Pittsburgh, Pennsylvania 15213
412/687-2440

DIRECTOR Sue O. Murdock

FOUNDING The Carnegie Library provided braille materials to its patrons as early as 1911. Service was expanded to include some out-of-state readers and, in 1931, Carnegie Library's Blind Division became an NLS/BPH Regional Library (one of the original 19 libraries in the network).

SPONSOR Since 1966, under contract to the State Library of Pennsylvania, Carnegie Library has operated the Regional Library that serves 38 counties in the western half of Pennsylvania.

STAFF A total of 19 staff members: 4 professional and 15 support (9 paraprofessional and 6 clerical).

SERVICE The Library provides service to disk, cassette, and large-print readers in Western Pennsylvania. (Braille readers in the state are served by the Regional Library in Philadelphia.) The Library has 6,121 individual and 354 institutional borrowers, all of them active. Each borrower's file is reviewed for service by a staff member every two to three weeks. In 1980, the Library circulated 567,848 items (including books and magazines). On-site service is provided to an average of 15 to 20 individuals per day.

HOLDINGS Book Data. The Library has a total of 254,259 books.

Disk:	142,700 copies; (title data not available).
Cassette:	107,058 copies; (title data not available).
Large Print:	4,501 copies; (title data not available).

Magazine Data.

Mailed by Library:	5 disk and 5 cassette titles; 4,827 subscriptions.
Mailed by Producers:	34 disk and 3 cassette titles; 10,380 subscriptions (excludes data on disk and large-print versions of Talking Book Topics).

Equipment Data.

2 machine types: 18,900 units
3 accessory types: 1,654 units

SYSTEM BRIEF

The system performs all book circulation functions, including automatic selection. It also provides for immediate staff review of each item selected for a borrower in the automatic-selection process. The system supports magazine circulation by providing mailing labels for subscribers, in a specified order, as copies of a particular issue become available. The system handles calendar, turn-around, and will-call service modes. Borrower, book, request, has-now, had-had, subject, magazine, and equipment data can be updated online and queried interactively. The system produces NLS/BPH-required reports as well as library management reports, including one that is used for weeding. The Pennsylvania Regional Libraries are currently modifying the system to produce computer-readable data for use in the NLS/BPH Comprehensive Mailing List system.

The system was developed for both Pennsylvania Regional Libraries by consultants with library experience. The primary system designer, a professor of library and information science, continues to provide maintenance and development support through the firm of Automated Systems Research and Development. An in-house Digital Equipment Corporation (DEC) minicomputer is used to run the system. The hardware configuration includes:

- DEC PDP 11/35 computer (96K memory), with RSX-11M operating system
- 3 DEC RPRO2 disk units (20MB each)
- 1 DEC TSO3 9-track tape drive (800 bpi)
- 1 DEC LA36-DE printer terminal (110-300 baud)
- 1 DEC LA34 printer terminal (110-300 baud)
- 1 DEC VT100 CRT terminal (variable, up to 9600 baud)
- 8 DEC VT52-AA CRT terminals (variable, up to 9600 baud)
- 1 DEC LP05 printer (30 lines per minute)
- 1 Dataroyal VSP IPS-7000 printer (120 characters per second)

The circulation system is programmed in FORTRAN IV and DEC MACRO 11.

TENNESSEE REGIONAL LIBRARY FOR THE
BLIND AND PHYSICALLY HANDICAPPED

729 Church Street
Nashville, Tennessee 37203
615/741-3915

DIRECTOR Francis H. Ezell

FOUNDING The Tennessee Regional Library was founded in 1970.

SPONSOR Department of Education, Division of Libraries and Archives.

STAFF A total of 13 staff members: 2 professional and 11 support.

SERVICE The Regional Library provides book and equipment circulation for eligible readers in Tennessee. The Library has about 6,000 (4,414 active) individual borrowers and 225 (209 active) institutional borrowers, and circulated 179,960 items, including books and magazines, in 1980. Each month, the Library serves about 350 individual and 15 institutional borrowers. On-site service is provided to an average of 10 individuals per month.

HOLDINGS Book Data. The Library has approximately 14,200 titles.

Disk:	7,600 titles;	(copy data not available).
Cassette:	4,500 titles;	(copy data not available).
Braille:	1,200 titles;	(copy data not available).
Large Print:	900 titles;	(copy data not available).

Magazine Data.

Mailed by Library:	4 disk, 1 cassette, 1 braille, and 1 large-print titles; 3,373 subscriptions.
Mailed by Producers:	37 disk, 3 cassette, and 36 braille titles; 4,588 subscriptions.

Equipment Data.

2 machine types:	10,800 units
3 accessory types:	1,000 units

SYSTEM BRIEF The Regional Library's automated circulation system, TACS (Tennessee Automated Circulation System), is currently in the final stages of testing, and is expected to be fully operational

within several months. It will perform all circulation functions for books, magazines, and equipment. The system will accommodate turn-around and will-call service modes. Staff members will be able to retrieve, display, and update borrower, book, request/reserve, has-now, has-had, subject, magazine, and equipment data online. The Library is planning to perform complex queries on TACS databases using a separate program already available at the State Data Processing Center. TACS will produce NLS/BPH-required reports as well as state-required reports.

TACS was developed by specialists from the State Systems Development Department working with the Regional Library staff. The Library operates the system via leased telephone lines to the State's mainframe computer, which is located at the State Data Processing Center. This computer system includes:

- Amdahl 470 computer (8MB memory)
- 64 IBM 3350 (300MB each) and 3300 Mod II (200MB each) disk units
- 12 IBM Model 8 and 16 STC Model 8 tape drives (1600/6250 bpi)

Equipment on-site at the Library includes:

- 7 IBM 3270 CRT terminals (2400 baud)
- 1 Telex TC286B printer (45 characters per second)
- 2 Recognition Equipment Class 130 OCR scanners

Information is not available on the specific computer resources required to operate the system. The circulation system is programmed in COBOL.

TEXAS STATE LIBRARY
DIVISION FOR THE BLIND AND PHYSICALLY HANDICAPPED

P.O. Box 12927, Capitol Station
Austin, Texas 78711
512/475-4758

DIRECTOR Donald K. Bailey

FOUNDING The Texas State Library began circulating braille materials in 1918. It became an NLS/BPH Regional Library (one of the original 19 members in the network) in 1931.

SPONSOR Texas State Library

STAFF A total of 43 staff members: 9 professional and 34 support.

SERVICE The Regional Library serves eligible borrowers throughout the state. It has 15,894 individual and 1,320 institutional borrowers, all of them active. In 1980, it circulated 860,248 items (including books and magazines). About 14,220 individual and 1,140 institutional borrowers are served each month. On-site service is provided to an average of 10 individuals per day.

HOLDINGS Book Data. The Library has 349,494 copies of 26,946 titles.

Disk:	9,369 titles;	148,282 copies.
Cassette:	8,591 titles;	127,257 copies.
Braille:	6,500 titles;	58,500 volumes.
Large Print:	2,486 titles;	15,455 copies.

Magazine Data. (not automated)

Mailed by Library: 4 disk, 6 cassette, 1 braille, and 2 large-print titles; 3,428 subscriptions.

Mailed by Producers: 38 disk, 3 cassette, 1 large-print, and 36 braille titles; (number of subscriptions not available).

Equipment Data. (not applicable)

SYSTEM BRIEF The Library's automated circulation system, which became operational in 1971, performs all book circulation functions, including automatic selection, for disk, cassette, and large-

print materials. Although data are entered via punched cards and circulation transactions are processed in batch mode, the system allows staff members to retrieve and display on CRT terminals borrower, book, request, has-now, has-had, and subject data. The system produces NLS/BPH-required circulation reports as well as daily book-circulation counts. The Regional Library staff and data processing specialists from the State Library are currently reviewing their requirements for future modifications. Among the enhancements under consideration are interactive data entry; magazine circulation functions; and the ability to send computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system.

The system was developed by State Library data processing specialists, who worked with Regional Library staff and IBM consultants. During its first four years of operation, the Library ran the system off-site, sharing an IBM mainframe computer owned by another state agency. In 1975, the State Library acquired its own IBM mainframe computer system, which includes:

- IBM 360/40 computer (384K memory), with DOS operating system
- 18 IBM 2314 disk units (26.7MB each)
- 2 IBM 2401 9-track tape drives (1600 bpi)
- 12 Telex 277D CRT terminals (baud rate not available)
- 1 IBM 1403 printer (1100 lines per minute)
- 1 IBM 2540 card reader (1000 cards per minute)

The circulation system is programmed in COBOL and IBM Assembly. It requires 332K memory and 350MB disk storage to operate efficiently.

WISCONSIN REGIONAL LIBRARY FOR THE
BLIND AND PHYSICALLY HANDICAPPED

814 West Wisconsin Avenue
Milwaukee, Wisconsin 53233
414/278-3045

DIRECTOR Mary Leon Miller

FOUNDING The Wisconsin Regional Library was founded in 1961.

SPONSOR The Milwaukee Public Library operates the Regional Library under contract to the State of Wisconsin. Funding is provided by the State Department of Public Instruction, Division of Library Services.

STAFF A total of 13 staff members: 2 professional and 11 support.

SERVICE The Regional Library provides book circulation to eligible borrowers in the state, although one subregional library, in Green Bay, serves about 300 borrowers. Equipment and magazine circulation for the state are provided by the Regional Library. The Regional Library has about 8,650 individual and 350 institutional borrowers on its statewide mailing list and circulated 170,503 items (including books and magazines) in 1980. Each month, the Regional Library serves about 3,000 individual and 150 institutional borrowers. On-site service at the Regional Library is provided to an average of 10 individuals per day.

HOLDINGS (Data are not yet available)

SYSTEM BRIEF The Regional Library is in the process of implementing an automated circulation system. Book circulation, including automatic selection and check-out, for disks and cassettes, and equipment circulation are currently operational. The system accommodates both turn-around and will-call service modes. Borrower, book, request, reserve, has-now, has-had, subject, and equipment data can be updated online and queried interactively. Several enhancements are planned or under development: braille book circulation; automatic report generation (NLS-, state-, and locally required reports, as well as library management reports on borrowers and book circulation); name access to the borrower database; title and author access to the book database; capability

to send computer-readable borrower data to NLS/BPH for use in its Comprehensive Mailing List system; immediate book check-out (for on-site service); and system-generated birthday greeting cards.

The system was developed by specialists from the Milwaukee County Federated Library System Data Processing Department working with Regional Library staff. It operates on several on-site, shared computers, including two minicomputers and a mainframe, and interfaces with the Plessey Checkpoint circulation software, installed in the Milwaukee County Library System, for selected check-in, check-out, and data entry functions (e.g., input of requests from Talking Book Topics). The minicomputer system hardware configuration includes:

- 2 Perkin-Elmer computers, 8/32 and 7/32 (500K memory each)
- 4 Perkin-Elmer disk units (256MB each) and 1 disk unit (10MB)
- 4 Perkin-Elmer tape drives (800/1600 bpi) and 1 tape drive (800 bpi)
- 4 Perkin-Elmer 1200 VDU CRT terminals (9600 baud)
- 1 Perkin-Elmer printer (600 lines per minute)
- 1 Plessey composite and 1 pen unit

The circulation system is programmed in COBOL.

APPENDIX B

Available Circulation Systems for NLS/BPH Libraries

A list of available circulation systems that have been described or referenced in this Guide are presented below in two separate charts. In Chart 1, we present those systems developed locally by one or more NLS/BPH Libraries. Because these systems have generally been funded with public money, particularly under the Library Services and Construction Act (LSCA), they are technically in the "public domain." This means that copies of the software can be made available at nominal reproduction costs. However, staff from other libraries will need to contact the Libraries in question for further availability and pricing information. To learn whether a particular software package developed locally is "portable"--i.e., whether the program can be run on some other computer--the Library staff will also need to discuss with appropriate personnel the compilers that were used in the creation of that program.

In Chart 2, we present the commercially available turnkey systems and identify those Libraries that are presently users of those systems.

In a number of instances, Libraries that have issued requests for proposal or requests for bid have made these requests available to vendors of general library circulation systems. Although these systems do not now have all of the capabilities that are needed by NLS/BPH Libraries, it may be useful for NLS/BPH librarians to stay abreast of developments in the general automated circulation area, since it is a fast-changing area. In cases where an NLS/BPH library is cooperating with a public library in a general automated circulation project, it may be particularly useful to consider these additional vendors, as well, in their exploration of alternatives. Therefore, we conclude this Appendix with a chart that lists general library circulation system vendors. Any omissions in this listing are unintentional.

> The following listing of commercially and locally produced systems does not imply endorsements by Cuadra Associates, Inc. or by the National Library Service for the Blind and Physically Handicapped, Library of Congress.

1. Locally Produced Software

Library[1] (State)	Programming Language	Computer Used
Alabama	COBOL 74	Univac 90/80 (mainframe)
Colorado	BASIC	Hewlitt Packard, 3000 Series III (minicomputer)
Florida	RPG2	IBM System 34 (minicomputer) and, previously, IBM System 3
Massachusetts (Worcester)	COBOL	Honeywell (mainframe)
Michigan (Lansing)	COBOL	Honeywell 3200 (mainframe)
Ohio (Cincinnati)	RPG2	IBM System 34 (minicomputer)
New York (Albany)	COBOL	Burroughs 7755 (mainframe)
Pennsylvania[2] (Philadelphia/ Pittsburgh)	DEC MACRO 11 and FORTRAN IV	DEC PDP 11/35 (minicomputer)
Tennessee	COBOL	Amdahl 470 (mainframe)
Texas	COBOL and IBM Assembly	IBM 360/40 (mainframe)
Wisconsin	(Primarily) COBOL	Perkin-Elmer (minicomputer)

[1]For complete details on contacts and addresses, please refer to Appendix A.

[2]See also, in Chart 2, Automated Systems Research and Development, Inc.

2. Commercially Available Turnkey Systems

Vendor	Library Users*	Programming Language	Computer
Data Research Associates, Inc. 4225 Laclede Avenue St. Louis, MO 63108 Contact: James J. Michael 314/533-9200	CA (Los Angeles) CA (Sacramento) IL MO NY (New York) OH (Cleveland)	BASIC PLUS 2	DEC (e.g., PDP 11/70) mini-computer
Neoterics, Inc. 1801 E. 9th St. Cleveland, OH 44114 Contact: John A. Lozan 216/861-3990	NJ	FORTRAN	Hewlett Packard (HP 1000 series) Minicomputer
Automated Systems Research and Development, Inc. [3] P. O. Box 271 Murrysville, PA 15668 Contact: James G. Williams 412/325-2394	PA (Philadelphia) PA (Pittsburgh)	DEC MACRO 11 and FORTRAN IV	DEC PDP 11/35 Minicomputer

[3]Software for this system is in the public domain. A copy can be obtained from either the Pennsylvania Regional Libraries or this vendor. Consulting, installation assistance, and maintenance services are also available from this vendor.

3. Other Vendors: General Library Circulation Systems

Cincinnati Electronics
2630 Glendale-Milford Road
Cincinnati, OH 45241

CL Systems, Inc. (CLSI)
81 Norwood Avenue
Newtonville, MA 02160

Dataphase Systems, Inc.
3770 Broadway
Kansas City, MO 64111

Gaylord Library Systems
Gaylord Brothers, Inc.
Box 61
Syracuse, NY 13201

GEAC
350 Steelcase Road West
Markham, Ontario
Canada L3R 1B3

Kaman Sciences Corp.
1500 Garden of the Gods Rd.
PO Box 7463
Colorado Springs, CO 80933

Plessey, Ltd.
Marketing International
Suite 904, 250 Consumers Rd.
Willowdale, Ontario
Canada M2J 4V6

Systems Control, Inc.
1801 Page Mill Road
Palo Alto, CA 94304

Universal Library Systems, Ltd.
807-100 S. Park Royal
West Vancouver
British Columbia
Canada V7T 1A2

APPENDIX C

Checklist of Circulation System Requirements

This Appendix contains a master list of circulation system requirements identified and described earlier in Part III of this Guide. These requirements reflect a wide range of design choices. They are intended to provide appropriate points of reference for personnel conducting requirements studies and/or evaluations of available systems.

Staff members in libraries that are planning for automation may want to use the columns provided in the checklist for rating the relative importance of various data elements, functions, and operations. In some cases, requirements are stated at a fairly general level, because there are a great many options and/or because the options are highly dependent upon other choices that have been made. In these cases, ratings will not be particularly meaningful, until greater specificity is supplied by library or data processing staff.

The numbers in this listing are the same as those used in Part III, to help readers to find the relevant discussion in the text for a particular requirement.

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
1.0 THE SYSTEM MUST PROVIDE FOR THE DEVELOPMENT OF A DATABASE OR SET OF FILES THAT CONTAIN DATA ON BORROWERS.				
1.1 General Borrower Data				
1.1.01 Borrower ID (local)				
1.1.02 Borrower ID (NLS/BPH)				
1.1.03 Borrower name				
1.1.04 Street address				
1.1.05 City				
1.1.06 State				
1.1.07 ZIP code				
1.1.08 County				
1.1.09 Telephone number				
1.1.10 Alternate street address				
1.1.11 Alternate city				
1.1.12 Alternate state				
1.1.13 Alternate ZIP code				
1.1.14 Dates for use of alternate address				
1.1.15 Birthdate				
1.1.16 Sex of borrower				
1.1.17 Handicap(s)				
1.1.18 Borrower type code				
1.1.19 Status				
1.1.20 Staff advisor				
1.1.21 Library that serves borrower				
1.1.22 Date first served/entered				
1.1.23 Notes				
1.2 Service Profile Information				
1.2.01 Language(s)				
1.2.02 Reading level/grade level				
1.2.03 Subject interests				
1.2.04 Exclusion criteria				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS		IMPORTANCE			
		1	2	3	4
1.2.05	Media				
1.2.06	Maximum number of books allowed				
1.2.07	Minimum number of requests needed to maintain level of service				
1.2.08	Service type				
1.2.09	Circulation quantities				
1.2.10	Request-only service				
1.2.11	Automatic selection acceptance				
1.2.12	Date of last service				
1.2.13	Number of items received				
1.3	Request and Reserve Information				
1.3.01	Number or ID of item (book, magazine, equipment) requested				
1.3.02	Date of request				
1.3.03	Source of request (for books)				
1.3.04	Number of items requested				
1.3.05	Book number of title reserved				
1.3.06	Date of reserve				
1.3.07	Number of items reserved				
1.4	Has-Now (In-Circulation) Information				
1.4.01	Number or ID of item (book, magazine issue, equipment unit) checked out				
1.4.02	Date of check-out				
1.4.03	Indicator for possession of equipment accessory type				
1.5	Has-Had (Previously-Circulated) Information				
1.5.01	Book number of item previously checked out				
1.5.02	Date of check-out				
1.5.03	Date of check-in				
1.5.04	Number of days in borrower's possession				
1.5.05	Book number below which books are not selected for borrower				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
1.6 Magazine Subscription Information				
1.6.01 Magazine ID				
1.6.02 Issue first received by borrower				
1.6.03 Date subscription began				
1.6.04 Priority indicator				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
2.0 THE SYSTEM MUST PROVIDE FOR THE DEVELOPMENT OF A DATABASE OR SET OF FILES THAT CONTAIN DATA ON BOOKS.				
2.1 General Title Information				
2.1.01 Title				
2.1.02 Title search key				
2.1.03 Non-filing indicator (for leading articles in titles)				
2.1.04 Author				
2.1.05 Author name search key				
2.1.06 Publisher				
2.1.07 City (city and state) of publication				
2.1.08 Year of publication				
2.1.09 Edition				
2.1.10 Reading/Grade level				
2.1.11 Exclusion indicators (not narrator-related)				
2.1.12 Subject codes				
2.1.13 Subject heading(s)				
2.1.14 Classifcation number				
2.1.15 Automatic selection allowed				
2.1.16 Series information				
2.1.17 Notes/Annotation				
2.2 Title Data Per Medium				
2.2.01 Book number				
2.2.02 Medium				
2.2.03 Recording speed				
2.2.04 Language				
2.2.05 Narrator name				
2.2.06 Narrator exclusion indicators				
2.2.07 Number of containers and/or volumes per copy				
2.2.08 Re-issue information				
2.2.09 Same title in other media				
2.2.10 Other titles on same disk or cassette				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
2.2.11 Master/submaster held				
2.2.12 Number of copies owned				
2.2.13 Number of copies checked out				
2.2.14 Number of copies available for check-out				
2.2.15 Number of copies in repair				
2.2.16 Number of copies lost or stolen				
2.2.17 Number of times circulated				
2.2.18 Borrower ID for requests				
2.2.19 Date of request				
2.2.20 Source of request				
2.2.21 Number of requests				
2.2.22 Borrower ID for reserves				
2.2.23 Date of reserve				
2.3 Per-Copy Data				
2.3.01 Copy number				
2.3.02 Availability status				
2.3.03 Date of last change in availability status				
2.3.04 Borrower to whom copy is checked out				
2.3.05 Number of times circulated				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
3.0 THE SYSTEM MUST PROVIDE FOR THE DEVELOPMENT OF A DATABASE OR SET OF FILES THAT CONTAIN INFORMATION ON EACH MAGAZINE.				
3.1 General Title Data				
3.1.01 Title				
3.1.02 Magazine code				
3.1.03 Publisher of the print publication from which braille, large-print, or recorded version is produced				
3.1.04 Frequency of publication				
3.1.05 Age/interest level				
3.1.06 Notes/annotation				
3.2 Title Data Per Medium				
3.2.01 Medium				
3.2.02 Language				
3.2.03 Distribution type				
3.2.04 Producer of the braille, large-print, or recorded magazine				
3.2.05 Producer address				
3.2.06 Subscriber (borrower) ID				
3.2.07 Subscriber priority ranking				
3.3 Per-Issue Data				
3.3.01 Issue number				
3.3.02 Issue date				
3.3.03 Master/submaster held				
3.3.04 Number of copies owned				
3.3.05 Number of copies checked out				
3.3.06 Number of copies available for check-out				
3.3.07 Number of times circulated				
3.3.08 Borrower ID				
3.3.09 Date of request				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
3.4 Per-Copy Data				
3.4.01 Copy number				
3.4.02 Availability status				
3.4.03 Date of last change in availability status				
3.4.04 Borrower to whom copy is checked out				
3.4.05 Number of times circulated				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
4.0 THE SYSTEM MUST PROVIDE FOR THE DEVELOPMENT OF A DATABASE OR SET OF FILES THAT CONTAIN INFORMATION ON EACH TYPE AND/OR UNIT OF EQUIPMENT.				
4.1 Per-Model/Accessory Type Data				
4.1.01 Model number/accessory code				
4.1.02 Number of units owned				
4.1.03 Number of units available for check-out				
4.1.04 Number of units checked out				
4.1.05 Number of units in repair				
4.1.06 Number of machines awaiting repair				
4.1.07 Number of units damaged beyond repair				
4.1.08 Number of units with unknown locations				
4.1.09 Number of units stolen				
4.1.10 Number of units lost in mail				
4.1.11 Number of units transferred in				
4.1.12 Number of units transferred out				
4.1.13 Number of units re-assigned				
4.1.14 Borrower ID				
4.1.15 Agency				
4.1.16 Priority				
4.1.17 Date of request				
4.2 Per-Unit Data				
4.2.01 Machine number				
4.2.02 Date added to collection				
4.2.03 Number of times checked out				
4.2.04 Availability status				
4.2.05 Date of last change in availability status				
4.2.06 ID of borrower to whom machine is checked out				
4.2.07 Lending agency				
4.2.08 Notes				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
5.0 THE SYSTEM MUST PROVIDE FOR THE SELECTION OF BOOKS.				
5.1 The system must accept and store relevant data on titles that are requested by borrowers and of titles that are selected for borrowers.				
5.1.1 The system must provide for borrower-originated requests.				
5.1.2 The system must provide for staff-originated requests (i.e., selections).				
5.2 The system must provide assistance to staff members in the identification of potentially suitable titles for borrowers who have titles selected on their behalf.				
5.2.1 The system must provide staff members with the means to review relevant borrower and book data in the process of their making selections for the borrower.				
5.2.2 The system must perform automatic selection of titles, according to a set of pre-established principles, that are suitable for each borrower designated to receive automatic selection service.				
5.3 The system must provide for the creation and maintenance of a request file--records of data on requests and selections--for use by the system in the check-out function.				
5.3.1 The system must identify borrowers who have fewer than the required minimum number of requests on file.				
5.3.2 The system, in automatic selection, must determine the number of titles that are to be selected for a given borrower.				
5.3.3 The system must determine the availability of copies of selected titles for assignment to borrowers in check-out.				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
6.0 THE SYSTEM MUST ASSIGN (CHECK OUT) BOOKS TO BORROWERS AND RECORD DATA ON THOSE ASSIGNMENTS.				
6.1 The system must identify those borrowers due for service.				
6.2 The system must determine for each title the availability of a copy in an appropriate medium, for assignment to a particular borrower.				
6.3 The system must make the needed number of assignments per borrower on the basis of priorities established by the library.				
6.4 The system must execute updates to the appropriate system files, to reflect changes in the status of data in the book inventory and borrower records.				
6.5 The system must produce cards, in an order to facilitate retrieval by library staff of items from the shelves, for use in mailings to and from borrowers.				
7.0 THE SYSTEM MUST RECORD THE RETURN (CHECK-IN) OF ITEMS BY BORROWERS.				
7.1 The system must update records in each file that is affected by the return of a book.				
7.2 The system must record a temporary shelf order or the location of copies, to eliminate the need for reshelving of returned books prior to the next checkout.				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed

REQUIREMENTS	IMPORTANCE			
	1	2	3	4
8.0 THE SYSTEM MUST GIVE THE SYSTEM USER ACCESS TO DATA CONTAINED IN THE STORED DATABASES AND/OR FILES.				
8.1 The system must give the system user access to data contained in the borrower database.				
8.2 The system must give the system user access to data contained in the book database.				
8.3 The system must give the system user access to data contained in the magazine database.				
8.4 The system must give the system user access to data in the equipment database.				
9.0 THE SYSTEM MUST PROVIDE FOR THE DISPLAY OF INFORMATION CONTAINED IN THE DATABASES AND/OR FILES.				
10.0 THE SYSTEM MUST PROVIDE FOR THE CREATION OF NEW RECORDS AND THE UPDATING OF EXISTING RECORDS BY LIBRARY STAFF AND THE SYSTEM FOR EACH OF THE DATABASES IN THE SYSTEM.				
11.0 THE SYSTEM MUST PROVIDE FOR THE GENERATION OF STATISTICAL REPORTS AND ORGANIZED LISTINGS.				
11.1 The system must produce NLS/BPH-required reports on borrowers, book and magazine circulations, and (as appropriate) equipment.				
11.2 The system must permit the library to obtain organized (i.e., sorted and/or formatted) management and reference listings (offline, on a line printer or printer terminal) of data that are stored in one or more files.				

RATINGS: 1=Essential; 2=Highly Desirable; 3=Desirable; 4=Not Needed